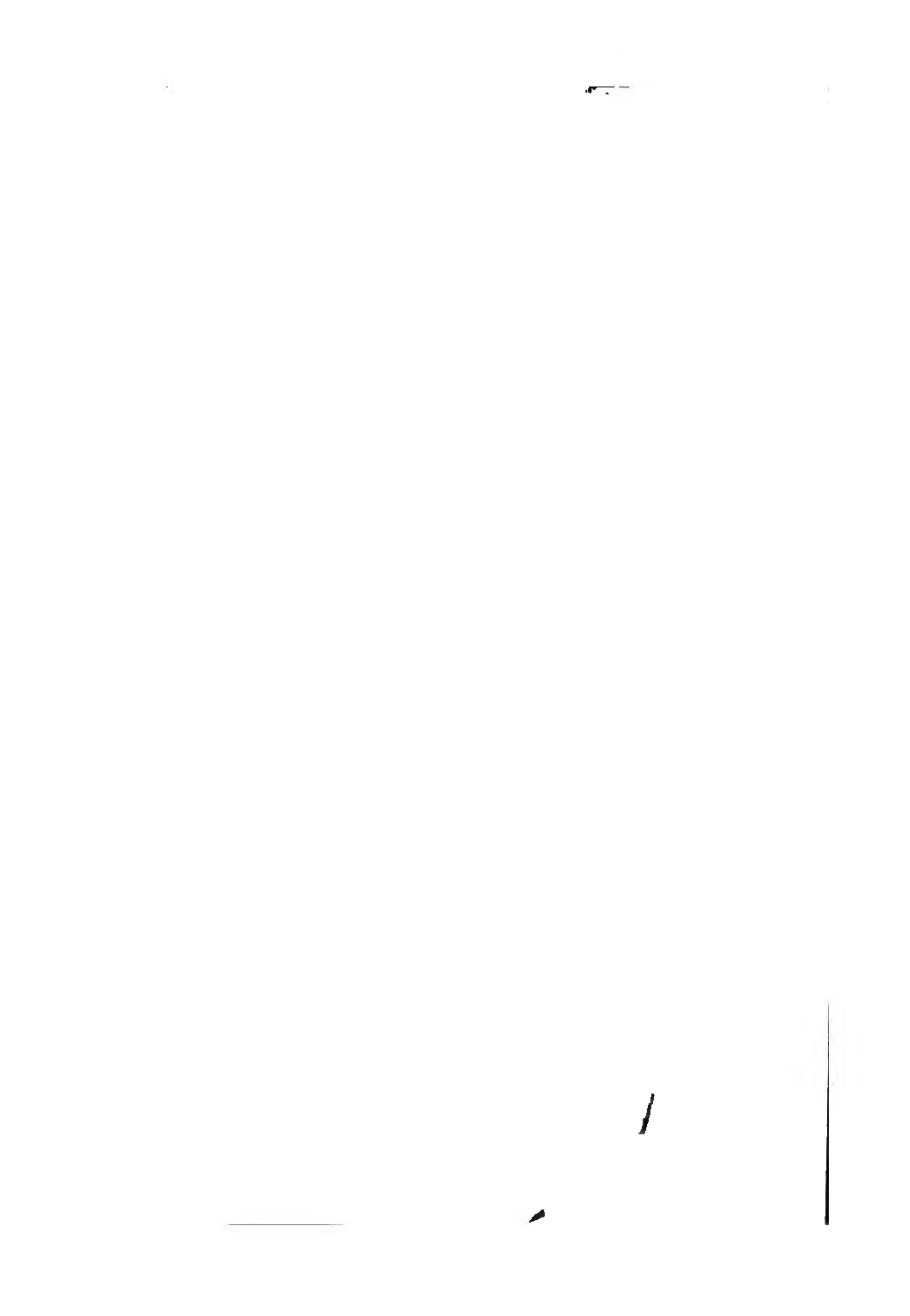


ARCHIVES

OF

OPHTHALMOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP AND DR. C. SCHWEIGGER
OF NEW YORK OF BERLIN

IN CONJUNCTION WITH

VOLUME XIV.

NEW YORK
G. P. PUTNAM'S SONS, 27 & 29 WEST 23D STREET
LONDON: 27 KING WILLIAM STREET, STRAND
WIESBADEN: J. F. BERGMANN'S Verlag
PARIS: J. B. BAILLIÈRE, 19 Rue Hautefeuille
1885

PAGE

ophthalmia, 409; Lens, 411; Vitreous, 413; Retina and functional disturbances, 414; Optic nerve, 416; Injuries, foreign bodies (parasites), 417; Ocular affections in constitutional diseases, 419.

20. Book Reviews 424

Clinical Studies on Diseases of the Eyes. By Ferdinand Ritter von Arlt, Der Elektro-Magnet in der Augenheilkunde. By Prof. J. Hirschberg.

21. Miscellaneous Notes 433

NUMBER 4.

1. Disturbance of the Color-Sense in Neuritis. By Dr. Augstein, of Bromberg, Prussia. Translated by Dr. H. Knapp. (See plate ix.) 435

2. The Antiseptic Action of Cocaine, Corrosive Sublimate, and Chlorine Water upon Dacryocystitic Secretions Tested by Inoculations of the Cornea. By Prof. H. Schmidt-Rimpler, Marburg, Germany. Translated by A. Schapringer, M.D., New York . . . 447

3. The Second Series of One Hundred Cases of Eye Disease Treated with the Galvano-Cautery. By Dr. A. Nieden, Bochum, Prussia. Translated by Dr. J. B. McMahon, New York. . . . 455

4. Systematic Report on the Progress of Ophthalmology During the First Quarter of the Year 1885. By H. Magnus, Breslau; C. Horstmann, Berlin; and A. Nieden, Bochum; with the coöperation of C. E. Fitzgerald, Dublin; E. Marckwort, Antwerp; P. v. Mittelstädt, Brussels; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc. Translated by Dr. F. E. D'Oench, New York . . . 467

A.—Dr. H. Magnus. Text-books, monographs, treatises on general bibliographical, and historical subjects, 467; Statistical papers, 468; General pathology, diagnosis, and therapeutics, 469; Instruments and remedies, 471; Anatomy, 473; Physiology, 476.
B.—Dr. C. Horstmann. Anomalies of refraction and accommodation, 478; Lids, 480; Lachrymal apparatus, 483; Muscles and nerves, 484; Orbit and neighboring cavities. 486; Conjunctiva, cornea, sclerotic, 488.
C.—Dr. A. Nieden. Iris, 500; Choroid, 501; Glaucoma, 502; Sympathetic ophthalmia, 503; Lens, 504; Vitreous, 506; Retina and functional disturbances, 506; Optic nerve, 509; Injuries and foreign bodies (parasites), 511; Ocular affections in constitutional diseases, 512.

5. Miscellaneous Notes 516

6. Index 517

VOL. XIV. No. 1.

ARCHIVES OF OPHTHALMOLOGY.

REPORT OF SIXTY-THREE CASES OF EXTRACTION OF CATARACT.

BY W. CHEATHAM, M.D.,

LECTURER ON DISEASES OF EYE, EAR, AND THROAT, AT THE UNIVERSITY OF LOUISVILLE.

IN my report of this series of extractions of cataract, I wish to call the attention of the profession to the rapidity of recovery and to the excellent result obtained in those cases operated on at the clinic of the university, to illustrate a matter to which I have given no little thought—that is, the after-treatment, especially in reference to the recumbent posture or rest.

Classification as to Age.

40 Yrs. to 50 Yrs.	50 Yrs. to 60 Yrs.	60 Yrs. to 70 Yrs.	70 Yrs. to 80 Yrs.	80 Yrs. to 90 Yrs.	90 Yrs. to 92 Yrs.
11	7	14	24	5	2

Classification as to Vision.

20/40	20/20	20/30	20/70	20/100	20/200	10/200	Perception of Light.	Zero.
7	16	19	7	5	1	2	3	3

Classification as to Anæsthetic Used or None.

Chloroform.	Ether.	Cocaine.	None.
6	24	3	30

Twenty-four of the sixty-three cases were moved, either in a wagon, a carriage, a street car, or walked, from six blocks to six miles, immediately after the operation, or the next day.

No.	Record.	Name.	Age.	General Health.	Quality and Duration of Cataract.	Functional Examination.	Method of Operating, Course of Healing, and Result, etc.
1	R. E.	M. M., Ind.	74	Good.	Senile. 4 years.	Visual field good.	Graefe linear. No anæsthetic. Bandage left off fourth day. Vision = $\frac{20}{50}$. Reads Jaeger No. 1. Operated upon at the college, and rode two miles in a wagon. Next day rode four miles more.
2	L. E.	M. M., Ind.	74	Good.	Senile. 4 years.	Visual field good.	Gr. lin. Operated upon at same time as right eye. V = $\frac{20}{40}$. J. 1. This is same patient as No. 1.
3	L. E.	B. McK., Ky.	92	Good.	Senile. 10 yrs,	Good.	Gr. lin. Ether. V = $\frac{20}{40}$. J. 1. Patient now 98 years old.
4	L. E.	Mr. C., Ky.	75	Good.	Senile. 2 years.	Good.	Gr. lin. Ether. Slight iritis second day. V = $\frac{20}{30}$. J. 1.
5	L. E.	Mr. S., Ky.	45	Not good. Full of malaria that would not yield to quinine.	Senile. 1 year.	Good.	Gr. lin. Ether. Operated on at the college, and sent to St. Joseph's Infirmary, a distance of about six blocks. V = $\frac{20}{70}$. J. 2.
6	R. E.	Mr. A. M., Ky.	75	Not good. Eczema of face and scalp. This was relieved by tar ointment.	Senile. 2 years.	Visual field good. Opacity of cornea.	Gr. lin., down. Ether. Rapid recovery. V = $\frac{20}{200}$; after needle operation = $\frac{20}{40}$. J. 1.
7	R. E.	Mr. S., Ky.	46	Good.	Senile. 1 year.	Good.	Gr. lin. Ether. Healing process normal. V = $\frac{20}{100}$. J. 2. Operated on at college, and sent six blocks.
8	L. E.	J. L., Ky.	70	Good.	Senile. 2 years.	Visual field good. Opacity of cornea.	Gr. lin. Ether. Healing process normal. V = $\frac{20}{100}$. Operated on at college, and removed one mile.
9	R. E.	Mrs. McC., Ky.	70	Good.	Senile. 3 years.	Good.	Gr. lin. No anæsthetic. Healing process normal. V = $\frac{20}{30}$. J. 1.
10	L. E.	Mrs. D., Ky.	82	Not good. Very feeble.	Senile. 5 years.	Not good.	Gr. lin. Chloroform. Cornea sloughed. V = 0.

11	L. E.	Mrs. R., Ky.	56	Not good. Weighs 346 lbs.	Senile. 1 year.	Good.	Gr. lin. Chloroform. Preliminary iridectomy. $V = \frac{20}{80}$.
12	R. E.	Mrs. W., Ky.	70	Good.	Senile. 2 years.	Good.	Gr. lin. No anæsthetic. $V = \frac{20}{80}$.
13	R. E.	S. B., Ky.	45	Good.	Senile. 3 years.	Good.	Gr. lin. No anæsthetic. $V = \frac{20}{70}$. Operated on at college, and rode in wagon one mile.
14	L. E.	S. B., Ky.	45	Good.	Senile. 2 years.	Good.	Gr. lin. No anæsthetic. $V = \frac{20}{80}$. Operated on at college, and rode in wagon one mile. Nos. 13 and 14 the same patient. Both eyes operated on at the same sitting.
15	R. E.	M. H., Ky.	45	Good.	Traumatic senile. Had undergone calcareous degeneration. 37 years.	Visual field good. Nearly all of cornea opaque. Pupil closed.	Knife plunged through nasal side of cornea, and through matted iris into the vitreous. De Wecker's scissors introduced and an incision made in upper part of matted iris, then withdrawn, and a similar incision made in lower part of membrane. The flap thus made floated back, and the calcareous degenerated lens, which up to this time was not known to be present, presented and was finally removed with iridectomy forceps after many attempts. Vitreous was fluid and flowed freely. Ether was used. Vision = reading J. 15. $V = \frac{15}{200}$.
16	R. E.	May F., Ky.	60	Good.	Senile. 2 years.	Good.	Gr. lin. Ether. $V = \frac{20}{40}$ with $+ \frac{1}{18}$. Reads J. 1. Operated on at college and sent fifteen blocks.
17	L. E.	L. McF., Ky.	40	Good. Drinks a great deal of whiskey.	Traumatic. 1 yr.	Good.	Gr. lin. No anæsthetic. Incision and iridectomy done nicely. Cystotome introduced and attempt made to tear capsule, which was very tough. Lens dislocated into vitreous chamber. Finally gotten back into posterior chamber by changing patient's position. Lens finally hooked out by putting cystotome behind it. About one sixth of vitreous lost. Small piece of iron found in lens. Slight reaction followed. $V = \frac{20}{80}$. Reads J. 1.

No.				General Health.	Quality and Duration of Cataract.	Functional Examination.	Method of Operating, Course of Healing, and Result, etc.
18	L. E.	Mrs. S., Ky.	80	Not good. Very feeble.	Senile. 7 years.	Good.	Graefe linear. No anæsthetic. Needled. V = [illegible]. Reads Jaeger No. 1.
19	L. E.	Mr. B., Ky.	50	Good.	Senile. 2 years.	Good.	Gr. lin. No anæsthetic. V = [illegible]. J. 1.
20	R. E.	Mrs. C., Ky.	67	Not good. Palsy.	Senile. 4 mos.	Good.	Gr. lin. No anæsthetic. V = [illegible]. J. 1, with a compound glass.
21	L. E.	Mrs. C., Ky.	67	Not good. Palsy.	Senile. 4 months.	Good.	Gr. lin. No anæsthetic. V = [illegible], with compound glasses. Reads J. 1.
22	R. E.	Mrs. F., Ind.	70	Good.	Senile. $1\frac{1}{2}$ years.	Good.	Gr. lin. No anæsthetic. V = [illegible].
23	R. E.	Mrs. F., Ky.	54	Not good.	Senile. 3 years.	Good.	Gr. lin. Ether. V = [illegible].
24	R. E.	M. D., Ky.	48	Good.	Senile. 8 years.	Good.	Gr. lin. Ether. V = [illegible]. Operated on at college, and sent two miles.
25	L. E.	M. D., Ky.	48	Good.	Senile. 8 years.	Good.	Gr. lin. Ether. V = [illegible] +.
26	L. E.	Mrs. M., Ky.	76	Good.	Senile. 5 years.	Good.	Gr. lin. No Anæsthetic. Needled. V = [illegible]. J. 1.
27	L. E.	Miss W., Tenn.	67	Good.	Senile. 6 weeks.	Not good. Floating bodies and crystals of cholesterine in right eye.	Gr. lin. No anæsthetic. Hyalitis. V = [illegible]. Fourth week, after exposing eye, a severe iritis set in, resulting in closure of pupil. Iridectomy indicated.
28	L. E.	May F., Ky.	61	Good.	Senile. 1 year.	Good.	Gr. lin. Ether. V = [illegible]., with + [illegible]. J. 1. Same case as No. 16. Operated on at college, and rode fifteen blocks.
29	L. E.	Mrs. T., Ky.	72 70	Not good.	Senile. 2 years.	Good. Right eye lost from extraction of cataract in Cincinnati.	Gr. lin. Chloroform. V = [illegible]. J. 1.
30	R. E.	Nancy T., Ky.		Good.	Senile. 1 year.	Good.	Gr. lin. No anæsthetic. V = [illegible] +. Operated on at college, and sent one and a half miles.

31	L. E.	J. D., Ohio.	40	Good. Drinks a great deal of whiskey.	Senile. 10 yrs. Calcareous.	Visual field good. Tremulous iris.	Gr. lin. Chloroform. Lens very thin and adherent to capsule. Had to be spooned out. Considerable vitreous lost. V = 20/80.
32	L. E.	J. E. G., Ky.	59½	Good. Weighs 257 lbs.	Senile. 2 mos.	Good.	Gr. lin. No anæsthetic. Needled two months later. V = 20/80. J. 1.
33	R. E.	Dr. W. S., Ky.	64	Good. Hemiplegia since 1864.	Senile. 8 years.	Good.	Gr. lin. No anæsthetic. Needled one month later. V = 20/70 +. J. 1.
34	L. E.	Mrs. C. S., Ky.	67	Good.	Senile. 2 years.	Good. Opacity of cornea.	Gr. lin. Ether. Needled one month later. V = 20/80 +. J. 1.
35	R. E.	Mrs. E. C., Ky.	69	Good.	4 years.	Good.	Gr. lin. No anæsthetic. Wound too small. Severe iritis. Needled two months later. V = 20/70.
36	L. E.	Mrs. H. D., Ky.	86	Not good. Very feeble.	4 years.	Good.	Gr. lin. Ether. Preliminary iridectomy four weeks before. Same patient as case No. 10, whose R. E. was lost four years ago. V = 20/80. J. 1.
37	L. E.	A. B., Ky.	81	Good.	Senile. 1 year.	Good.	Gr. lin. Ether. Preliminary iridectomy. Iridectomy wound had not healed, although it was performed four weeks ago. Anterior chamber empty. Cataract knife tore capsule, so cystotome was not used. Wound too small, so it had to be enlarged by scissors. V = 20/70. J. 2.
38	R. E.	P. R., Ind.	67	Good.	Senile. 6 mos.	Good.	Gr. lin. No anæsthetic. Operated on at college, and sent in carriage six blocks. Left eye operated on at same time. Needled. V = 20/80 +
39	L. E.	P. R., Ind.	67	Good.	4 months.	Good.	Gr. lin. No anæsthetic. Conjunctiva folded over edge of cornea, so as to cause counter-puncture to be made too far back. Needled. V = 20/80 +. Rode six blocks after operation.
40	L. E.	A. H., Ky.	70	Not good. Palpitation and indigestion.	Senile. 3 years.	Good.	Gr. lin. Ether. Rode one and a half miles after operation. V = 20/70 +. Cannot read.

No.	Record.	Name.	Age.	General Health.	Quality and Duration of Cataract.	Functional Examination.	Method of Operating, Course of Healing, and Result, etc.
41	L. E.	J. B., Ky.	72	Good.	Senile. 1 year.	Good.	Graefe linear. Ether. Rode one mile after operation. V = $\frac{20}{50}$ +. Cannot read. Right eye operated on at same time.
42	R. E.	J. B., Ky.	72	Good.	Senile. 6 mos.	Good.	Gr. lin. Ether. Rode one mile after operation. Left eye operated on at same time. Conjunctiva rather redundant, and overlapped sclero-corneal junction, causing counter-puncture to be made too far back. Considerable hemorrhage. Iris pushed in front of knife and was cut. V = $\frac{20}{40}$ —. Cannot read.
43	R. E.	R. M., Ky.	72	Not very good.	Senile. 6 months.	Eye glaucomatous. Glaucoma absol., left eye.	Gr. lin. No anæsthetic. Lens escaped, with some vitreous, as soon as incision was finished. No iridectomy made. Iritis with closure of pupil followed. Iridectomy. V = $\frac{20}{100}$. J. 2.
44	R. E.	Mr. D., Ind.	73	Not good.	Senile. 1 year.	Good.	Gr. lin. No anæsthetic. Iritis seventh day. Leeched three times. Needled. V = $\frac{20}{40}$. J. 1.
45	L. E.	Mr. Z., Ky.	54½	Good.	Senile. 3 months.	Good.	Gr. lin. Ether. Operated on at college, and rode one mile after operation. V = $\frac{20}{40}$. Reads Snellen No. 1.
46	R. E.	A. J., Ind.	75	Good.	Senile. 2 years.	Good.	Gr. lin. Ether. Rode ten blocks after operation. Iritis sixth day. Healing slow. V = $\frac{20}{50}$. J. 1.
47	R. E.	N. W., Ind.	70	Feeble.	Senile. 6 months.	Good.	Gr. lin. No anæsthetic. V = $\frac{20}{70}$ +. J. 1.
48	R. E.	J. B., Ky.	91	Not good. Rheumatic. Extremely choreic.	Senile. 2 years.	Good.	Gr. lin. Chloroform. This case was as perfect a representation of second childhood as I ever saw. No control over muscles whatever. V = $\frac{20}{100}$. J. 3.

49	L. E.	M. G., Ky.	70	Good.	Senile. 7 years.	Good.	Gr. lin. No anæsthetic. Rode one mile after operation. $V = \frac{20}{80}$. J. 1.
50	R. E.	M. S., Ky.	61	Good.	Senile, calcareous. 60 years.	Visual field good. Leucoma adhaerens.	Gr. lin. No anæsthetic. In this case it was my intention to do a preliminary iridectomy, but rupturing the lens capsule with either my knife or a pair of back-toothed iridectomy forceps, and the lens presenting at the wound, I enlarged the latter with De Wecker's scissors and extracted the lens. No reaction scarcely. $V = \frac{15}{200}$. J. 6.
51	R. E.	E. S., Ky.	64	Good.	Senile. 6 months.	Good.	Gr. lin. No anæsthetic. $V = \frac{20}{40}$. J. 1.
52	R. E.	Mr. H., Ky.	65	Not good.	Senile. 6 years.	Good.	Gr. lin. No anæsthetic. Iritis with closure of pupil. Perception of light good. $V = \frac{1}{\infty}$.
53	L. E.	N. J., Ky.	59	Not good.	Senile. 1 year.	Good.	Gr. lin. Ether. Suppuration of cornea. $V = 0$.
54	L. E.	Mrs. A., Ky.	70	Not good.	Senile. 10 years. Hypermature.	Not good. Gives a history of hyalitis. General opacity of cornea.	Gr. lin. Ether. Healing process perfect up to third week, when iritis set in, resulting in closure of pupil. Good perception of light. Iridotomy indicated, but fear it would not do much good on account of opaque cornea. $V = \frac{1}{\infty}$.
55	R. E.	P. O. C., Ky.	47	Good.	Senile. 1 year.	Good.	Gr. lin. No anæsthetic. Rode six blocks after operation. $V = \frac{20}{80}$. J. 1.
56	R. E.	C. K., Ind.	76	Good.	Senile. 1 year.	Good.	Gr. lin. No anæsthetic. $V = \frac{20}{40}$. J. 1.
57	R. E.	A. M. B., Ind.	68	Good.	Senile. 9 years.	Not good. Syn. ant. Opacity of cornea. Very small portion of cornea clear.	Gr. lin. No anæsthetic. $V = \frac{20}{200}$.
58	L. E.	Mrs. S., Ind.	57	Not good. Hemiplegic.	Senile. 6 mos.	Not good. Myopia.	Gr. lin. Chloroform, but was not pushed far on account of bad heart. Before iridectomy could be performed, lens and vitreous escaped. $V = 0$.

No.			Age.	General Health.	Quality and Duration of Cataract.	Functional Examination.	Method of Operating, Course of Healing, and Result, etc.
59	R. E.	Mrs. M., Ky.	49	Not good.	Senile. 5 years.	Good.	Graefe linear. Ether. V = [illegible]—.
60	L. E.	S. J., Ky.	74	Good.	Senile. 1 year.	Good.	Gr. lin. No anæsthetic. Walked, and rode on street car one mile. V = [illegible]. Cannot read.
61	R. E.	S. J., Ky.	74	Good.	Senile. 1 year.	Good.	Gr. lin. Muriate cocaine. V = [illegible]. Same as 60. Double extraction.
62	R. E.	A. J.	81	Good.	Senile. 2 years.	Visual field good. Stricture of tear duct.	Gr. lin. Muriate cocaine. V = [illegible]. Rode in carriage one mile.
63	R. E.	Mrs. F., Ky.	76	Not good. Lost 40 lbs. in two weeks.	Senile. 6 mos.	Not good.	Gr. lin. Muriate of cocaine. Iridectomy three or four years ago; a severe iridocyclitis suppurativa set in the second day, lasting six or eight weeks, leaving pupil almost closed. Large objects can be seen. Inflammation not yet subsided. Patient still under observation. V = ?

The result in these twenty-four cases is as follows:

$V = \frac{20}{30}$, three cases; $V = \frac{20}{40}$, seven cases; $V = \frac{20}{50}$, eight cases; $V = \frac{20}{70}$, four cases; $V = \frac{20}{100}$, two cases. Of these twenty-four cases, six of them (twelve cataracts) were double (right and left eye at once) extractions.

Of the three cases in which there was perception of light, one took chloroform, one ether, and in one I used muriate of cocaine. Of the three cases with vision zero, two took chloroform and one ether.

I wish it understood that the cases reported here are not selected ones, but given as they came in.

To draw my average of success from them just as given here appears to me unjust, for several reasons. Taking vision $\frac{1}{10}$ as a success, I lost eight cases out of the sixty-three, or one in $7\frac{7}{8}$. The two cases which received only $\frac{15}{200}$ I consider more of a success than any of those which received $\frac{20}{30}$, because of the condition of the eyes before operated upon. One of them was a patient whose left eye was shrunken to a button. His right eye had an exceedingly small portion of clear cornea; the pupil closed, or no signs of a pupil; a calcareous lens, that had to be removed with forceps. The eye had been in this condition for thirty-seven years. Besides this, he was deaf, which complicated the after treatment.

In the other I had opacity of cornea, with only a small portion of clear cornea, a hypermature cataract of sixty years' standing. Of the three cases of perception of light, two of them promise good results from a second operation—say, iridotomy. These are unfinished cases, consequently I think should be left out. The other one of the three was one of little promise, on account of a general opacity of cornea, and hyalitis. Leaving out, then, these five cases, which I think is but fair, I have three losses in fifty-eight extractions, or one in $19\frac{1}{3}$.

In the beginning of this paper I referred to the after-treatment, especially to posture for the first few days after extraction. I am inclined to believe that we keep our patients in bed too much. In coming to this conclusion, it is true I have but the twenty-four cases to draw from.

These twenty-four cases are all that I have operated upon at the University of Louisville. All of them, as I said before, had to either ride or walk, either immediately after the operation or the next day, from six blocks to six miles. Of these twenty-four extractions, twelve of them (six cases) were double; none of them were lost. Of these twenty-four, about eighteen had extremely poor accommodations after the operation. Many of them had not even a dark room. Four of them, no physician saw after the operation, until they returned to me the third or fourth week. These cases were not picked cases. Usually badly fed, and not near so promising as the others. Yet they show a much better result. As I before stated, I recognize the smallness of the number. Very few of the many traumatic cases I have, in many of which the trauma is much greater than that resulting from cataract-extraction, are put to bed, or even stay in the house. Most of them are treated as office patients, reporting there every one, two, or three days as I think necessary. Many of these cases of trauma are in elderly people.

When I can, I put my cases on a little preliminary treatment—say calomel and quinine,—with a good night's rest. When possible, I think the urine should be tested by a competent man.

A word as to the muriate of cocaine. The three cases in which I used it said they suffered none. Two of them were extremely nervous subjects; could not possibly have stood it without either the cocaine or some general anæsthetic.

Antiseptics were used in none of my cases further than washing instruments in either Listerine, alcohol, saturated solution of boric acid, or solution of hyd. bi-chlo., 1 to 2,000.

Preliminary iridectomy in Nos. 11, 36, 37, and 63. Kept no record of size of iridectomy. Always aimed to make it about two thirds the size of the section. Puncture and counter-puncture.

Puncture—in all, just at sclero-corneal junction; tried to make counter-puncture at same point opposite. Counter-puncture too far back in cases 39 and 42.

Apex of section—kept no record of it. Aimed to have it at sclero-corneal junction.

Opening of capsule. No record kept as to point of rupture. Aimed to make it peripheral in a majority of the cases, especially so in the last two or three years. Cystotome used in all cases, except 15 and 37, where capsule was ruptured by knife; No. 50, where it was ruptured by either knife or iridectomy forceps; and in 43 and 58, where it was ruptured by the action of orbicularis palpebrarum and recti muscles.

Expulsion of lens—whether instrumental or not. Lens expelled in all cases, except those mentioned below, either by pressure of spoon over edge of lens opposite corneal section, or with one spoon as above, and another over scleral edge of wound. In case No. 15, the lens was removed with iridectomy forceps; in case No. 31, it was spooned out; in case 17, it was hooked out with a cystotome; in Nos. 43 and 58, they were expelled by the orbicularis palpebrarum and recti muscles.

Cleansing. I always aim to leave wound clean, and no cortical matter behind; often remove cortical matter by palpebral pressure, sometimes by means of a Daviel's spoon introduced into anterior chamber.

Bandaging. In all of the cases, I first applied a bit of soft linen, then absorbent cotton or picked lint, holding them in place by a flannel roller bandage. In the last six cases, I placed over this a shade or curtain, made of a couple of folds of dark cloth, such as I use after the bandage is removed.

SYMPATHETIC OPHTHALMIA—A CASE OF RECOVERY WITHOUT OPERATION, AND A CASE OF PECULIAR ACTION, WITH RECOVERY AFTER THREE OPERATIONS.

By P. D. KEYSER, M.D., Philadelphia, Pa.,

PROFESSOR OF OPHTHALMOLOGY, MEDICO-CHIRURGICAL COLLEGE, PHILADELPHIA.

IT is the accepted fact that enucleation of the injured or primarily affected eye is the best and proper treatment of sympathetic ophthalmia, and also in many cases, especially traumatic, where sympathetic affection might take place. But as to the time and necessity of the operation there is much difference of opinion in the profession, and only from records of cases can we learn the different characteristics of this serious trouble and its treatment.

F. P., aged twelve years, was brought to my clinic January 15, 1881, with a small puncture through the corneal edge of the right eye, caused by the end of a piece of wire springing suddenly and sharply against the ball. The iris had prolapsed, and was attached in the wound. There was pericorneal injection and iritis, with the vision reduced to light and moving objects only. The injury occurred the day after Christmas, just three weeks previous to the time of my seeing him. The left eye was sympathetically affected by ciliary injection, discoloration of the iris, photophobia, pupil slightly dilated and inactive, and vision cloudy.

On examining the right eye carefully, I feared to meddle with it at present, as the position of the wound of the cornea and prolapse of the iris were so close to the ciliary edge that it was impossible to cut through to loosen the attachment or make an iridectomy ; and to enucleate was, from the degree of sympathetic

affection of the other eye, I thought too late; so the only thing was to admit him to the hospital and treat him expectatively. He was put in a dark room with a black bandage over the eyes to exclude all light; given internally quinine and belladonna, while a weak solution of sulphate of atropia (gr. $\frac{1}{5}$: ℥ i.) was instilled into the eyes once daily,—in doing which the eyes were opened but a moment in the light of a candle. This treatment was continued five weeks, when all irritation and inflammation in the eyes had passed away, and he was discharged from the institution with the right-eye pupil irregular, being drawn up toward the point of adhesion to the corneal cicatrix, and $V = \frac{4}{24}$. The left eye $V = \frac{6}{6}$. When discharged I told him to return on the first sign of any trouble in either eye, but he has never called in these four years past.

It has been a mooted question for a long time among ophthalmologists as to what ought to be done in such cases. Prompt enucleation of the injured eye by many, while some few have advised waiting with expectative treatment, and have reported cases of recovery. Others again suggest a broad, free iridectomy in both eyes, but in this case it could not be made on the injured eye, and furthermore such procedure has not been successful in my hands in saving the other eye.

The following case was not protected from danger by a free iridectomy and removal of the prolapsed iris, although performed soon after the injury:

E. C., aged four years, was brought to me October 2, 1880, with an incision on the outer side of the cornea of the right eye, near the sclero-corneal edge, which was received that morning from a pebble shot from a rubber gun. The incision was 2 *mm.* in length, perfectly straight and clean, as if made by a knife, through which the iris was prolapsed the size of a large mustard-seed. Neither capsule nor lens was injured. Eserine solution (gr. iv.: ℥ i.) was dropped in the eye every fifteen minutes for an hour to get a strong contraction of the iris so as to reduce the prolapse, which, not taking place after a couple of hours, the child was etherized, and finding the reduction could not be made by pushing the iris back into the anterior chamber with a Wecker's spatula, I considered it best to remove it by making a free iridectomy. A good piece of the iris was removed and the cut

edges and angles properly freed from the corneal wound and replaced.

For two weeks I saw her regularly, and the eye appeared to be doing splendidly; inflammation passing off and vision good in the eye. Then she was not brought to see me for two weeks, when I noticed that she did not open her eyes, and held her head down to shield the eyes from the light. Upon opening the lids I found the left eye seriously sympathetically affected. There was marked ciliary injection, iris discolored, photophobia with great lachrymation, aqueous humor slightly discolored, edges of the pupil had the appearance of thin lymph being thrown out, so much so as, with the discoloration of the aqueous, to prevent clearness of the fundus. The ciliary region was painful on pressure. The vision was quite dim, and the little patient saw better out of the injured eye. She had not previously nor did she then complain of any pain. The whole trouble came on without her parents noticing it. The mother had been sick and could not bring her to see me, while the father was at his work. Noticing, however, that she did not see so well for several days past and kept in dark places, her father determined to leave his work and bring her to me. The right (injured) eye looked very well; it was quiet and clear, but on close examination I found that the upper edge of the iris had washed back into the corneal incision in healing, and was there attached in the cicatrix, causing a pulling on the tissues of the iris and ciliary body.

It was too late to enucleate the injured eye, and then it had just now the better vision, so that it might eventually be the only one retaining sight. On consultation with my colleagues in the Wills' Eye Hospital, the prognosis was declared hopeless; but they agreed with me that it was too late and would be unjustfiable to remove the right eye then. I therefore proposed to free the iris from its attachment to the cornea, to see what it would do, and admitted her at once for the operation and treatment. Under the anæsthetic of ether, a v. Graëfe's cataract knife was passed in through the cornea so as to go over the point of iritic attachment and incise it through as the knife was made to cut its way out of the cornea. As soon as this was done, the iris was grasped by the forceps, drawn out, and again cut off. Atropia solution was instilled and both eyes were completely covered with a thick, black Liebreich bandage, so that not a ray of light could penetrate anywhere. Unguentum hydrargyrum was rubbed night and morning on the left temple, and small doses of quinine and belladonna were given three

times a day. A collyrium of atropia (sulph. gr. $\frac{1}{8}$: ℥ i.(was instilled twice daily. She was kept in a dark room and every precaution was taken to prevent any light from striking the eyes, except for a moment from a candle when instilling the atropia. The room she was confined in was one of the large wards of the hospital, so that her mother who remained with her could walk her about for exercise and amusement. After two weeks of such treatment, the left eye began to look better. The pupil dilated somewhat, and the ciliary injection was less. The right eye healed from the last operation and remained quiet. On the fourth week no lymph was to be seen in the pupil of the left eye and it was largely dilated, the ball free from any inflammation. As soon as the lids were opened the little patient exclaimed that she could see. The right (injured) eye, however, did not look so well. There was considerable pericorneal injection, and sight much dimmer. In a few days the sight of this eye was entirely lost and the pericorneal injection had much increased, while the left eye, or sympathetically affected one, had cleared up perfectly ; there was not a sign or trace of inflammation about it ; the pupil was dilated *ad maximum*, with no adhesions, and sight returned.

Thinking now was the time for operative interference, to be on the safe side and to save the left eye from any recurrent inflammation, I advised enucleation of the injured eye at once, and it was done that day. It may not have been necessary, but I thought it prudent to do so, and six weeks after, she was discharged with perfect vision in the remaining eye, and it has remained so ever since without any return of inflammation.

The enucleated ball was cut through its antero-posterior axis in the horizontal meridian, incising the corneal cicatrix. The iris was found free from any adhesion, but thickened at the ciliary border and attached to quite a formation of lymph that was lying on the ciliary body and extending along the upper line of the incised iris, while the lower line of the iridectomy was perfectly free.

AN ACCIDENTAL DIVULSION OF A PTER YGIUM LEADING TO AN IMPROVEMENT IN THE REGULAR OPERATION.

By A. E. PRINCE, M.D., of Jacksonville, Ill.

(*With a wood-cut.*)

CONCERNING the separation of the corneal portion of a pterygium, within the limits of my research, the results are scarcely what one should hope to obtain.

First, in the operation of grasping the growth with forceps and dissecting it from the cornea with scissors, its complete removal, when extensive, without leaving remnants of opaque material, is practically impossible.

Secondly, in the efforts to separate it from the cornea with a sharp knife, the imperfection of human dexterity leads either portions of the deeper strata of the pterygium to be left, to atrophy into opaque tissue, or the superficial layer of the substantia propria to be wounded, by the cutting edge, resulting too often in facets or opacities.

In the hope of being able to present a consideration of value in the treatment of these extreme cases, involving the pupillary area of the cornea, is offered a summary of my notes of an accident which occurred about two years since.

In the case of a middle-aged man whose left eye was defective from injury, a fleshy pterygium extended from the nasal side to the temporal margin of the pupil, cutting off direct vision except when under the influence of a mydriatic. He was told that the removal of the growth could not be effected without leaving opacities on the already invaded cornea, and that to secure the

best possible vision an iridectomy would probably be required; but as the growth had already covered the pupil and was still actively progressive, an attempt at its removal was imperative. Having a very wide base the excision of so much conjunctiva would certainly have limited abduction to a prejudicial degree; hence it was determined that Knapp's modification[1] of Desmarres' transplantation operation[2] would give the best results, and it was accordingly undertaken.

Following my usual custom, a small strabismus hook was passed under the pterygium near the corneal margin and such traction made as would lift the pterygium from the surface of the sclera and facilitate its separation from the bordering conjunctiva, as well as the preparation for its transplantation, the corneal separation being left to the last. The lateral incisions to the base of the pterygium were made, and then, with Wecker's scissors extended upward and downward into the retro-tarsal folds, and sutures inserted into the angles, to receive the divided apex.

Thus far the strabismus hook had been held by an assistant and the steps of the operation had been uneventful when, by an unskilful act, the hook was *torn from its position and the entire corneal portion of the pterygium separated from its underlying surface.*

An inspection converted solicitude into satisfaction, for, in place of the usual opaque remnants and corneal irregularities, was seen a transparent surface and a well-defined pupil.

The appearance was that of an extensive epithelial abrasion, corresponding to the area of the unexposed cornea.

Inasmuch as Arnold's researches[3] had demonstrated the facility with which corneal epithelium, under favorable circumstances is regenerated, this condition was not looked upon as unfavorable.

The apex was then divided by a longitudinal incision extending to the caruncle, and the apex of each half transplanted into the incision prepared for its reception, and after the requisite sub-conjunctival dissection the free edges were united in the usual manner in the median line.

---

[1] Knapp: "Pterygium Operation durch-doppelte Transplantation," *Graefe's Arch. f. Ophth.*, 1868, Bd. xiv., Abth. 1, p. 267.

[2] Desmarres: "Traité des Maladies des Yeux," t. ii., p. 169.

[3] Arnold, *Virchow's Archives*, about 1868.

With directions to keep the eye constantly moistened with a cold compress soaked in a half per cent. aqueous solution of pure carbolic acid, he returned to his home in Winchester to continue under the observation of his family physician.

Some months later he returned, to my surprise, with a perfectly transparent cornea, and though it is to be regretted that an unavoidable delay prevented the minute inspection of his cornea and measurement of his vision, in the interval of which he disappeared, I regarded it as the most perfect result that had ever come to my notice.

Since that time, it has fallen to my lot to operate twelve times in this manner, and it has been my observation, as stated by Schreiter in his inaugural dissertation "Untersuchungen über das Flügelfell,"[1] that there appears to be no intimate connection between the pterygium and Bowman's membrane, which permits the growth to be removed *en masse*, except when it has been associated during its formation with corneal ulceration, in which case we might expect the condition illustrated by Alt[2] of a wedge-shaped penetration by the connective tissue of the pterygium, into the substantia propria of the cornea, in which condition one would expect resistance to the effort at divulsion.

In my experience, the results have been so gratifying that, with the accompanying hook, having a cutting point to favor its introduction and a wedge-shaped edge to facilitate the separation, we submit the operation to the judgment of the profession, hoping that the acknowledgment of the accident may have an educational value.

[1] *Graefe-Saemisch. Augenheilkunde*, Bd. iv., p. 138.
[2] Alt: "Lectures on the Human Eye," 1880, cut 12, p. 30.

THE TREATMENT OF SUPERFICIAL AND INFILTRATING VARIETIES OF PAVEMENT EPITHELIAL CARCINOMA OF THE EYELIDS.

By ROBERT SATTLER, Cincinnati, O.

THE importance of epithelial neoplasms of the palpebral area, entitles them to a most careful consideration, principally on account of their well-known progressive and destructive tendencies. Interference of some kind, to prevent almost inevitable dangers from resulting deformity of the lids and defective protection of the globe, is imperative in those cases in which the history and local alterations of the growth render a successful arrest or removal probable. In other more advanced cases, with extensive infiltration and destruction of tissue, in which the local changes preclude the prospects of a radical disappearance, at least relief from suffering and perhaps a retardation of an otherwise uninterrupted progress can be effected by prompt appropriate, measures.

The comparative frequency of epithelial growths in this locality, among persons predisposed by age, heredity, and other causes to their occurrence; the almost uniformly insignificant beginning and frequently overlooked progress; the well-known latent or non-progressive tendency, comprising often a period of years and followed by a sudden and uninterrupted destructive advance, are all well established characteristics which can only receive a passing reference. For the same reason the clinical, pathological and histological features of the different forms of pavement-cell, cylindrical, and glandular cell carcinoma are not referred

to, as it is the purpose of this communication to refer to the operative treatment of these treacherous neoplasms, and to give the results of personal observation and experience in the management of the most frequent forms of the disease in this locality, *i. e.*, the superficial or lobulated, and the infiltrating or tubulated forms of pavement-cell epithelial carcinoma.

The methods to effect the removal of these growths are many and various, and include the caustics, the knife, thermo-, galvano-, and the actual cautery. That all these methods, either separately or combined, have in a large proportion of cases, accomplished the purpose for which they were resorted to, must be admitted, but on the other hand it must also be conceded that many and perhaps the larger proportion of cases have eluded successful treatment by the above means, even though they were clearly indicated and were resorted to early, promptly, and thoroughly.

Unsatisfactory observations, the result of a limited personal experience, induced me to test more extensively the value and merits of the method of scraping, suggested and practised by Prof. Volkmann, for the arrest and treatment of lupus nodules and ulcers, but also resorted to by him and other German surgeons for the removal of epithelial tumors.

Among the first cases observed was one of a superficial lobulated epithelioma of the lower lid, which had defied the use of caustics,—zinc. chlor., acid. monochloroacet., arsenic pastes, etc. The patient persistently refused excision, which it may be inferred, was at once proposed when she was first examined. Impressed with the inefficacy of caustic agents and the needless pain their application produced, I resorted to the plan of scraping the infiltrated area with Volkmann's steel spoon or scoop, without informing my patient of its surgical nature. The scraping was thoroughly done and the result was excellent. Seven years have elapsed and no return has been noticed. The neoplasm was situated in the lower lid, was oval in shape, and about one and one half *cm.* long and one *cm.* broad. Its upper edge approached to within four *mm.* of the lid margin,—the outer two thirds of which were everted by the traction and weight of the growth,—and it extended obliquely toward the centre of the cheek. The patient was forty-six years old and in good general health. She had noticed an

"irritable wart," which was situated in the site of the affected area, for eight or nine years, but only within the last fourteen or sixteen months had it increased in size, accompanied by a tendency to ulceration and local stinging and discomfort. The histological structure of the growth consisted of closely packed groups of flat or pavement epithelial cells imbedded in a vascular stroma, traversed by cicatricial bands and warts or fringe-like projections.

The cicatrix which followed this radical scraping was smooth and superficial. The ectropium which existed before the operation, was made to disappear effectually by stretching the scar.

In the second case, a man, æt. fifty-two, the growth was of more than ten years' standing. It had invaded the outer two thirds of the right upper lid and almost the entire border of the lower lid. Necrosis of certain parts, indolent ulcerations covered with crusts and ectropium, were prominent features of the infiltration. The cutaneous area of the right lower lid, side of the nose, malar region, and cheek, had been the seat of destructive ulceration, which had transformed this region into a thin, clean, shining white surface. At its lower termination, a wall of waxy nodular elevations, concealing foci of ulceration was arranged in a semicircular manner, presenting all the characteristics of both the progress and results of a rodent form of ulceration, which had started from and was engrafted upon the specific growth.

Thorough excision, combined with a plastic operation was resorted to without delay. No reaction followed, and the immediate result of the operation was favorable. In four months a return in the outer and also the inner portion of the upper lid, near its border, was noted. Both points were speedily excised. After this operation, without a plastic to cover the defect, only about one fifth of cilia-bearing lid border of the upper lid remained ; the entire border and adjoining region of the lower lid had been removed. At the same time, the semi-circular wall of nodular waxy elevations was attacked and thoroughly scraped and excavated. Several attempts followed the first one, and accomplished an arrest of the ulcerative process in this region. In the course of five months fresh foci of the neoplasm developed, particularly near the inner canthus. The steel scoop was from this time exclusively resorted to to combat the destructive tendency of the disease, to prevent greater deformity, and to relieve pain. Not alone was the removal of the infiltrated portions more easily accomplished, but it was also attended with, less pain and reaction

afterwards, and was followed by a less dense and more elastic cicatricial covering. It did not or could not completely arrest the disease, but it opposed and modified its progress in a variety of ways, and was at the advanced stage of the growth more applicable and effectual than the knife or caustics.

A third case also demonstrated to me the advantage of the scraping over the use of the knife ; yet I venture to say that in this locality the knife would have been the choice of any surgeon to effect the removal of the growth.

A clergyman, aged fifty-six, sought relief from a chronic dacryocysto blennorrhœa. In treating the tear-sac trouble, I discovered a suspicious eroded warty growth in the left posterior auricular region. The patient was aware of its presence, and said it had existed for years, and that at times it caused him great annoyance. Microscopic examination revealed its epithelial nature. Immediate removal was advised, to which the patient willingly assented. The growth was about 1¾ *cm.* long and 1¼ *cm.* broad ; it had invaded only the skin. It was circumscribed by a deep incision and removed, together with a broad border of healthy skin. Feeling secure, on account of the liberal excision, that this would end the neoplastic formation, I was not a little surprised to find, after four months—the disease for years antedating the operation having shown no special tendency to advance,—a return in connection with the cicatrix of the first operation, and also a new infiltration of skin in its vicinity. Immediate excision with most liberal attachments of healthy skin was practised. Complete union and no reaction followed. After the lapse of eight months, not alone were points of infiltration to be discovered in the scars of the two former operations, but numerous new points existed in addition. The knife was abandoned, the scraping-spoon being used in its stead. The ease of manipulation, diminution of pain, and absence of reaction impressed me so favorably, and accomplished so completely the disappearance of this troublesome affection, that I determined to give it an extensive and systematic trial, in all typical and suitable operative cases of epithelioma, in dispensary practice.

From March, 1878, all cases in which operative interference was indicated were treated according to this method. During this period thirteen cases were observed. Eight belonged to the superficial and five to the deep or infil-

trating variety. In nine patients the scraping method was exclusively practised; in three it was combined with excision. In some a single scraping sufficed; in others several were necessary to bring about an arrest of progress or an effectual disappearance. All were examined microscopically, and were found to belong to the superficial lobulated and infiltrating or tubulated variety of pavement-cell or flat epithelial carcinoma.

The eight cases belonging to the superficial variety could be subdivided, according to their most distinctive alterations, into cicatricial (2), necrotic (3), warty (2), and rodent (1); of these, four were situated on the lower lid, one at the inner canthus, involving the caruncula lachrymalis and semilunar fold, one at the outer canthus, involving also the lower lid, and two on the side of the nose, extending over the tear-sac region. All these cases were treated by the scraping method, and all recovered. Three of this number had received previous treatment by excision and caustics.

Five belonging to the infiltrating, presented all the histological characteristics of this variety; these were subdivided into the simple tubulated (2), papillomatous (2), and rodent (1).

Four were treated by excision and scraping combined. In one case exenteratio orbitæ was necessary, and most effectual work was accomplished by the scraping spoon.

The tubulated varieties involved the lower lid and burrowed along the inner wall and floor of the orbit. In both cases the disease began in the lower lid; the first[1] was excised and thoroughly scraped, and up to the present time, a period of several months, developed no activity.

The second case began in the lower lid, destroyed it entirely, invaded the upper lid, and pushed its destructive course along the inner wall of the orbit and attacked the globe. This case had been in the hands of competent surgeons, and also so-called cancer quacks. It would be difficult to say what had not been done for this poor woman. When she applied for relief there was so much infiltration

[1] This case came to the clinic during my absence, and was treated during its entire progress by Dr. S. C. Ayres.

near the inferior margin of the orbit and on the globe, that to facilitate the operation I excised this mass and carefully detached with a pair of scissors the exuberant tissues adhering to the globe. After this the knife was not again used, and the remaining portions were removed by the aid of the scraping spoon, even from the sclera. The scraping was repeated in different parts of the growth, at least twelve times during a period of almost three years. During this time the patient enjoyed comparative freedom from suffering, danger from hemorrhage was lessened, enucleation of the extensively infiltrated and adherent globe was not necessary, and the advance of this malignant neoplasm was arrested and markedly modified. Each scraping made to arrest some fresh or recent manifestation of the disease was attended and followed by the best possible results under the hopeless circumstances. Recently, however, either in consequence of latent inherent activity of the growth, or the result of impaired health, physical exhaustion, or age, it has again developed most startling activity.

The papillomatous variety was treated by exenteratio orbitæ and thorough scraping of the bony walls. The globe and all the tissues of the orbit, including both upper and lower lids, were involved in the disastrous process.

For eight months no return was observed, and the patient was improved in every respect; a recent communication, however, refers to the not unexpected but, certainly delayed return of the disease. The second case, the disease being not so extensive and with less malignant tendencies, was more favorably influenced by the scraping method of treatment.

The rodent variety was an unusually extensive and disastrous illustration of the disease. Interference was not deemed indicated or justifiable. All the structures of the orbit had succumbed to the destructive process, the soft parts over cheek, nose, frontal, temporal, malar, and anterior auricular region had disappeared, and in addition the bony structures were extensively and hopelessly infiltrated.

As already stated, the scraping method, by the aid of sharp steel scoops or spoons, of variable size and shape, was

the method, even in the infiltrating forms, which was relied upon to bring about an arrest or a complete disappearance of the disease. If it is stated that excision was performed, it was only resorted to to render the removal of large areas of infiltration more speedy. The attempt, however, to eradicate, or at least arrest, the disease in those portions which were accessible to the influence of the instrument, was made by the former method.

The presence of microscopic foci, notably in the glandular structures of the skin or in the connective tissue of the subcutaneous region, or the lymphatics, etc., surrounded by areas of perfectly healthy tissue, would, of course, oppose a complete removal of these concealed and not to be discovered hiding-places of the disease, as effectually as the knife or caustics. In this locality particularly, although the rule of operative art and experience is not to spare tissue, owing to the well-known treacherous characteristics of these growths, it is a point of paramount importance to save as much healthy tissue as possible, and avoid dense scars on account of the unsightly deformity and dangers to the globe. Therefore, a reckless excision is as unjustifiable as a too cautious one. For this reason this method appears to me particularly applicable to this locality. It is easy of accomplishment, little or no reaction is to be feared, and the adjacent healthy or non-infiltrated regions are not removed, and the defect after the scraping is not much greater than the infiltration before it.

All the cases referred to, with the exception of one, were observed in dispensary practice, and if at first the method was not extensively resorted to in private practice, it was because the trust and safety in the removal by the aid of the knife was too secure in my mind to permit of its being supplanted by a method not extensively practised and arousing doubt and fear as to its real efficacy. I may add that after it had been thoroughly tested, and its advantages established by the observations referred to, and in addition corroborated by a number of cases in private practice, it is now looked upon as a most valuable and reliable method of management; in many cases, without doubt, far superior to

excision, caustics, etc., and in others, again, inferior to the latter methods. Yet it is applicable in so many cases, that it deserves recognition and a trial where other methods have failed, or where the knife and caustics are no longer of advantage, and also in a large number of cases where it may be resorted to in conjunction with them.

My observations prompt the following suggestions: When thoroughly accomplished the scraping method is of particular advantage and superior to the knife, and, therefore, should enjoy preference and its principal application in the management of the different varieties of *superficial lobulated pavement* epithelial cancer of the lids or adjoining regions, for the following reasons:

a. The defect of tissue after is not greater or deeper than the infiltrated area at the time of operation.

b. Little or no danger from inflammatory reaction.

c. The formation of a smooth superficial covering of the excavated area, which on account of its pliable and elastic nature interferes least with the protective function, and secures also better adaptation of the altered lid to the globe.

d. The invaluable advantage of being able to observe the cicatrized base of the recently affected area, and, therefore, discover easily and early any reproduction of the growth.

e. It is rarely necessary to resort to plastic operations.

Other advantages are: the ease and readiness of performance of the method, less pain during and after the operation, avoidance of dense or extensive scars and those dangers which attend the healing of the wounds.

In the *deep or infiltrating forms* it is of the greatest advantage when combined with cautious excision. It can be resorted to alone with prospects of success only in a limited number of cases of this variety of the disease.

This method, either alone or combined with excision, has the valuable and not to be overestimated advantages:

a. That it accomplishes the removal of part or parts of the growth with the least sacrifice of tissue.

b. That it is as safe and more easily accomplished in many cases.

c. In those cases where excision promises little or nothing it should have the preference, because it accomplishes as good a result with less pain, hemorrhage, and deformity.

d. In those cases where excision is clearly indicated, and rational promptings for its selection exist, it may be advantageously combined with it, as it can remove traces or concealed foci of infiltration which are beyond the scope of the knife.

ON THE USE OF THE ACTUAL CAUTERY IN THE TREATMENT OF ULCUS CORNEÆ SERPENS.

By Dr. EMIL GRUENING, New York.

THE mycotic origin of the ulcus corneæ serpens is generally conceded at the present day, and the therapeutic indications derived from this view are either the removal of the noxious substance or its destruction *in situ*. As a radical destroyer of the infecting material the actual cautery commends itself to our consideration. Deprived of its heroic nature by the anæsthetic action of cocaine, the actual cautery no longer fills the heart of the patient with terror, and is practicable alike in the dispensary and the hospital service.

At the January meeting (1885) of the N. Y. Ophthalmological Society, the writer reported seven cases of ulcus corneæ serpens treated with the actual cautery under cocaine, and to this number he can now add three new cases. Of these ten cases seven can be classified as belonging to the incipient stage of ulcus corneæ serpens, showing a well-marked arc of propagation, two as belonging to a more advanced stage with a complete zone of propagation, and one as being hypopyon keratitis with considerable destruction of corneal tissue and blennorrhœa of the lachrymal sac. As a preliminary step in the treatment of these cases, the nose and lachrymal sacs were examined and thoroughly cleansed whenever necessary. The eyes were washed with a saturated solution of boracic acid, atropinized, and cocainized until corneal anæsthesia ensued.

The point of a delicate platinum probe provided with a suitable handle was brought to a red heat in a spirit lamp placed behind the patient. The lids were separated and the eyeball steadied with the forefinger and middle finger of the left hand, while the right hand lightly applied the red-hot point to the arc or zone of propagation. In no instance did the patient suffer any pain. In the seven cases of incipient ulcus corneæ serpens a single application of the cautery sufficed to stay the destructive tendency of the disease. Under the compressive bandage applied after the cauterization the eschar was thrown off within twenty-four hours, leaving a clear ulcer, which in all these cases healed in less than a week's time. The two cases belonging to a more advanced stage of the disease were not so manageable. In the first case it was necessary to apply the cautery three times in as many days before the septic zone disappeared. In the second case the cornea perforated at the point of cauterization and the iris prolapsed. The repeated instillation of a three-per-cent solution of sulphate of atropia freed the iris from the corneal clasp. The ulcer healed in a fortnight with the formation of a transparent facet, which disturbed vision considerably.

The case of hypopyon keratitis occurred in the person of a destitute and decrepit old woman who was treated as an out-door patient. Though the anterior chamber was half filled with pus and the corneal defect very deep, three cauterizations of the border and floor of the ulcer, in combination with instillations of a three-per-cent. solution of atropia and the compress bandage, effected a very satisfactory healing of the corneal wound with but slight opacity.

In the incipient stage of the ulcus corneæ serpens, characterized by the superficial arc of propagation, the actual cautery fulfils all the requirements of a classic procedure, acting cito, tute, et jucunde.

In the more advanced stages of the disease, when the floor of the ulcer is considerably thinned and infiltrated and the anterior chamber partly filled with septic material, the actual cautery cannot supplant the operation proposed by Saemisch. In these cases a combination of the two methods appears

rational, for the actual cautery destroys the septic material of the cornea, and the Saemisch section removes the septic material from the anterior chamber.

It has been asserted that the corneal opacities resulting from the use of the actual cautery are very dense, and that vision is consequently greatly reduced. This assertion is not corroborated by the cases here related. In no instance did the process of repair result in a true leucoma, and the ensuing corneal opacities only attained the density of nebulæ or maculæ. The delicate probe-pointed platinum cautery used in the treatment of these cases is, in the opinion of the writer, far preferable to either the galvano-cautery or Paquelin's thermo-cautery. Three seconds are required to bring the platinum cautery to a red heat, at which it remains two seconds, a sufficiently long time to accomplish the sterilization of the zone of propagation. Such transient heat is less apt to cause irritative radiation and corneal perforation.

Both the galvano-cautery with its connecting cords and the thermo-cautery with its rubber attachment interfere materially with the freedom of manipulation and the delicacy of touch so indispensable to the proper limitation of the caustic action. The platinum wire is also to be preferred to the ordinary iron probe, inasmuch as it is brought more rapidly to a red heat and neither corrodes nor scales.

ON THE USE OF THE GALVANO-CAUTERY IN EYE DISEASES, ESPECIALLY IN DESTRUCTIVE PROCESSES OF THE CORNEA.

By Dr. A. NIEDEN, of Bochum.

(*With one wood-cut.*)

Translated by Dr. J. B. McMahon, New York.

THE application of the actual cautery was introduced, as is well known, into ophthalmic practice about ten years ago. Martinache[1] recommended it for hypopyon keratitis, and Samelsohn[2] for conjunctival and other affections, yet it did not take a firm hold on the profession.

Whether it was due to a want of familiarity with this therapeutic resource of the ancients, or to the rude form of instruments (heated pins, strabismus hooks, etc.), the use of which was in such marked contrast with the delicacy of the ordinary methods of operation, the recommendations of Gayet,[3] Gillet de Grandmont,[4] G. Martin,[5] and Fuchs[6] failed to remove the feeling of aversion entertained by ophthalmologists against it.

---

[1] "Ulcers of the Cornea Treated by the Actual Cautery." *Pacific Med. and Surg. Journ.*, 1873, p. 294.

[2] "Galvano-Cautery in Ophthalmic Surgery." These ARCHIVES, vol. iii., No. 2, p. 124, 1874.

[3] Gayet: "Cauterization of the Cornea," *Gaz. hebd.*, 6, 1877, and *Gaz. des Hôpit.*, No. 11.

[4] Gillet de Grandmont: "On Opacities of the Cornea and their Treatment," 1881. *France méd.*, Paris, vol. xxviii., p. 278.

[5] Martin: "Mode of Action of the Actual Cautery in Corneal Ulcers." *Journ. de Méd. de Bordeaux*, vol. x., 1880, p. 182.

[6] Fuchs: "The Use of the Actual Cautery in Ulceration of the Cornea." *British Med. Journ.*, 1880, vol. ii., p. 780.

Still there was a universal recognition of the insufficiency of the ordinary, well-known methods of treating destructive processes of the cornea, whether by medication, as with atropine, eserine, fomentations, chlorine water, and the pressure-bandage, or by operative measures, such as Saemisch's incision, and iridectomy.

The proportion of cures obtained in these cases, a sad experience in which led Roser in 1855 to assert that very little reliance could be placed in therapeutic means, became steadily more favorable in later years, so that Horner in 1871 could report the following results: 11.5 % phthisis, 24.6 % leucoma, 57.4 % cure with favorable termination. In spite of this improvement, the use of Saemisch's incision was greeted on all sides as an essential advance, and, as is well known, found ready acceptance in practice on account of its excellent results. The percentage of phthisis was by it reduced to 9 %, of leucoma adherens to 26.5 %, and maculæ to 61 %. With this positive and pleasing improvement in therapeutic methods, there were still some drawbacks which demanded attention. The principal of these was the still high percentage of ruined eyes. In consequence, the newly recommended treatment by iodoform was promptly put on trial everywhere. It seemed at first to answer every expectation, but the more sober statistical consideration of the results of Deutschmann,[1] Vossius,[2] Alker,[3] still showed 6 % or 7 % of phthisis. Very recently Schiess[4] appeared with a publication of the results of linear cauterization, mainly of the lower fornix of the conjunctiva, which showed in favor of this method only 1.4 % phthisis, 28 % moderate success, 66.2 % success, although employed in the severest cases. Whilst all previously recommended methods of treatment had been

[1] Deutschmann: "Some Observations on the Employment of Iodoform in Ophthalmic Practice" (University Eye Clinic at Göttingen). *V. Graefe's Arch. f. Ophthalm.*, vol. xxviii., 1, p. 214.

[2] A. Vossius (Königsberg University Eye Clinic): "On the Use of Iodoform in Ophthalmic Practice." *V. Graefe's Arch. f. Ophthalm.*, vol. xxix., 1, p. 297.

[3] H. Alker: "On the Therapeutic Value of Iodoform in Diseases of the Eye" (Giessen University Eye Clinic).

[4] R. Fisch: Linear Cauterization. A contribution to the treatment of destructive processes in the cornea. Inaug. Dissert. (Prof. Schiess), Basel, 1884.

favored on the purely empirical ground that they had afforded the discoverer good practical results without regard to the modus operandi, the introduction of the iodoform was, however, based on the pathologico-anatomical recognition of the infectious character of most of the destructive ulcerative processes in the cornea. Thanks to the labors especially of Horner[1] and Leber,[2] the cause of the disease was found in the mycotic action of fungi in the corneal parenchyma, and, at the same time, a rational explanation was discovered of the well-known fact that in dacryocystoblennorrhœa even trifling injuries of the corneal epithelium often lead to the severest forms of corneal ulceration. The endeavor to satisfy the causal indication induced Sattler[3] to recommend strongly the galvano-caustic method as a most powerful antiseptic agent.

On his recommendation, I adopted this method in my practice about a year ago, and have employed it in such specific cases as serpent or rodent ulcers, scrofulous abscesses, both marginal and central, the frenulum phlyctenulare with a patch of infiltration at the apex, the parenchymatous corneal abscesses occurring in trachoma, and in xerosis corneæ. My observations thus far number about 140 cases, of which I shall review only the first hundred for the sake of even numbers. I wish to give a short summary of what can be accomphished by this new method, and, if I may anticipate a little, I hope to convince my readers, as the excellent results have already convinced me that the employment of the galvano-cautery is to be highly recommended as a general method, and does invaluable service in cases for which it is specially suited.

Among the first hundred cases were seventy-three of traumatic keratitis, caused mostly by injuries from cold (not glowing) pieces of iron, pieces of coal, etc.

Corresponding to the kind of employment, ninety-two were males and only eight females.

---

[1] Horner: "Disinfectant Treatment of Some Diseases of the Cornea." *Klinische Monatsbl. f. Augenheilk.*, vol. xii., 1874, p. 432.

[2] Leber: "Inflammation of the Cornea due to Septic Infection." *Centralbl. f. med. Wissensch.*, 1873, p. 129; and "Keratomycosis Aspergil. as a Cause of Hypopyon Keratitis." *V. Graefe's Arch. f. Ophthalm.*, vol. xxv., 2, p. 265.

[3] Sattler: "Transactions of the 15th Annual Meeting of the Heidelberg Ophthalmological Society," 1883, p. 104.

As to the nature of the processes of disease, there were eighty-three cases (eighty-three per cent.) of fully developed corneal ulcer, which showed more or less markedly the characteristic signs of the malignant form, considerable ciliary irritation, pericorneal injection, dirty discoloration of the floor of the ulcer, diffuse infiltration of the corneal tissue adjoining a part or the whole of the periphery of the ulcer, turbidity of the aqueous, hypopyon, and greater or less hyperæmia of the iris.

Hypopyon, as is well known, is not to be considered a characteristic sign of malignancy, but only indicates the intensity of the process; so, it was noted as present in fifty-six cases and as absent in twenty-seven, which, however, should be regarded as affections of the same kind as the former, only of more recent date.

Of the fifty-six cases of hypopyon three showed marked rodent ulcers, extending characteristically by scattered, sharply defined patches of infiltration in the adjoining tissue, which rapidly increased, destroying in twenty-four hours the bridges between them and the rim of ulcer, the process ceasing only when the margin of the cornea was reached.

Dacryocystoblennorrhœa was a complication in the comparatively trifling proportion of six per cent.; of the six cases three (fifty per cent.) showed rodent ulcers.

Still the danger of injury from chemical and microbiotic foreign bodies in the occupations of the patients who mostly come under my observation is so great that it can be considered fully as serious as the complications of serpent ulcers with fungi from the pus of dacryocystitis, which occur under other conditions in such a large percentage of cases. For the sake of statistics, I would add, in parenthesis, the further observation that the right side suffered most in this affection, being involved forty-six times, the left thirty-seven.

Of the remaining seventeen cases twelve were diagnosed as scrofulous ulcer of the cornea. They showed, generally at the periphery, sometimes toward the centre of the cornea, a deep, crater-shaped excavation with sharply cut edges, ac-

companied by a high grade of ciliary irritation and mucopurulent conjunctival secretion, and defying all therapeutic measures till the cornea had been penetrated either by operation or spontaneously.

Of the remaining five cases two were torpid infiltrations, lasting for weeks without any special irritation of the eye, and without tendency either to get worse or to improve; two showed the form of phlyctenular keratitis (frenulum phlyctenulare) having at the apex of the broad bundle of vessels a crescentic grayish-yellow patch of infiltration, which involved steadily more and more of the healthy corneal tissues. There was one case of typical xerosis corneæ.

All these cases we must now, without hesitation, refer to the class of infectious corneal processes. They seemed to be specially suited to the use of the cautery.

As a rule an attempt was first made to determine the power of diffusion of the cornea and the susceptibility of the iris to the action of atropine, by repeated instillations of which it was sought to obtain the maximum dilatation of the pupil.

If after being observed twelve to twenty-four hours, the ulcer showed a tendency to extend, and did not seem controllable by the simpler methods of treatment, the galvano-cautery was promptly resorted to. A single application often sufficed to destroy the masses of detritus clinging to the floor of the ulcer, but frequently the heated loop was applied rapidly two to ten times in order to thoroughly clear the whole floor of the ulcer and its infiltrated border.

In a few cases (four), in which, either on account of the extensive hypopyon, or because the destructive process had advanced so far as to lay bare Descemet's membrane, and had so made the emptying of the anterior chamber desirable, the end of the loop was applied a moment longer, and so the floor of the ulcer was perforated, and the aqueous humor and, in part, the hypopyon evacuated.

At first thought such a manipulation might seem dangerous, but experience shows that at the moment when the opening is effected the aqueous rapidly escapes and

promptly cools the galvano-caustic loop. All danger of injury to the iris or lens is thus removed, and the operation is certainly easier of performance than paracentesis with the knife.

As an immediate effect of the operation the floor of the ulcer is covered with a crust which is colored either grayish or brownish, according to the duration of the application of the cautery. The operation is executed without lid-speculum, with no other fixation than by the thumb and index-finger of the operator's left hand, as in Liebreich's method of cataract-extraction, without assistants and without anæsthesia.

It sometimes happens that, at the moment when the loop begins to glow, the patient notices the heated point before the ulcer has been touched, and makes an unforeseen movement of his head; the loop may thus graze the surface epithelium of the cornea in the neighborhood of the ulcer and produce an opaque stripe with white borders. This disappears in twenty-four hours, leaving not the slightest opacity to give evidence of the accident. It is well to be aware of the harmlessness of this accident, and so possibly be spared some anxiety.

In a short time we observe a surprising change. The adjacent corneal tissue gains increased transparency, and, as a rule, the aqueous becomes considerably clearer, probably a natural result of the chemico-mechanical interference with the physiological activity of the parts. The trifling pain ceases rapidly, the ciliary neurosis disappears in about the same time, the pupil dilates under vigorous use of mydriatics, and the congestion of the iris subsides. The subjective improvement of the patient, the cleansing of adherent necrosed parts from the floor of the ulcer, the fading of the zone of infiltration, the complete disappearance of the turbidity of the aqueous, and beginning or advancing absorption of the hypopyon show, within the next twenty-four hours, not only that the destructive process is at an end, but that the process of repair has already begun.

In eighty-two cases but a single application of the cautery was necessary; in fourteen cases the process had to be

repeated after an interval of two days ; and in four the cautery was resorted to three to six times. To these last cases belonged the already mentioned rodent ulcers, in which the appearance of every new point of infection demanded its prompt destruction. If in the so-called serpent ulcer, at even a single gray point, the slightest tendency of the zone of infiltration to extend is noticed, the process should be at once nipped in the bud by renewed galvano-cauterization.

In three cases, on account of the great quantity of pus, which occupied more than half the anterior chamber, or on account of its density, after cleansing the floor of the ulcer, I was obliged at once, or on the following day, to make a paracentesis of the cornea for the easier evacuation of the pus. A repetition was never necessary.

As to the results of this method of treatment I entirely agree with the statement of Sattler and Kuhnts at the next to the last ophthalmological meeting in Heidelberg, that it frequently surpasses all our expectations.

As naked facts and not general commendation are to be expected from statistic material, I shall now take leave to present them.

On studying my report some will probably entertain a suspicion that I have chosen only the most favorable cases observed, and have from prejudice selected my cases, as indeed often happens. This, however, is not the case. As already stated, I have collected the first hundred cases just as they presented themselves, from November 5, 1883, when I used the cautery for the first time.

Further, the high percentage (80%) of grave ulcerous processes—66.25% of these hypopyon ulcers—would give poor support to the view that only the less serious forms were submitted to the galvano-caustic treatment.

The final result is that not a single one of the diseased eyes was lost, the percentage of phthisis being thus reduced to 0. Compare this with the results obtained thus far under other methods of treatment, with 1.4%, 4%, 9.7%, and 11.5% phthisis, and it must be regarded as extremely satisfactory.

Further, the ulcers so treated show only a very slight tendency to leave the marked cicatricial opacities which

otherwise so commonly occur after these processes. Sattler drew special attention to this, and established experimentally the fact that in no other method can one see more beautifully and clearly the process of repair in the cornea, with its pictures of division of the nuclei of the corneal corpuscles and of the epithelial cells, than after the application of the actual cautery. We need not wonder, then, that a true leucoma was observed in only twelve cases of the one hundred, more or less marked maculæ remaining as a result of the ulcerative process in the other eighty-eight. Exact statements of the amount of vision preserved in the separate cases are of no value, as in the majority (75 %) of the cases the ulcers were central or nearly so, and such an opacity, whether light or dense, always causes a very considerable diminution in the central visual acuteness. Such statements would then afford no evidence as to the the real value of the method, as, for example, a perforating ulcer at the periphery always gives much better visual results than the slightest ulcer at the centre of the cornea, although the former is a much severer affection than the latter. The trifling density of the cicatrix is easily understood when we consider of how much shorter duration the ulcerative process is after the use of the cautery than under any other method. The average duration of the treatment, counting from the date of the first application of the galvano-cautery till the resumption of work by the patient, was thirteen and a half days; counting to the time when the stimulant treatment with Pagenstecher's salve could be adopted, the average was ten days. In connection with these favorable results, we should consider, too, that in this method we attack the disease at once and energetically, and destroy it in the bud.

Whilst, on one hand, in suppurative inflammations of the cornea, due to the entrance of infected foreign bodies, we adopt the expectant plan in order to test the effect of the ordinary therapeutic means upon the progress of the ulcer, and hesitate to make an incision extending considerably beyond the borders of the ulcer when this is extending but slowly and when the hypopyon is insignificant, and

whilst, on the other hand, this delay often leads to considerable destruction of the corneal tissue in depth and breadth, we can now resort promptly to the galvano-caustic loop, destroy the poisonous intruder, and induce a new, fresh reaction in the entire tissue.

The cure is obtained "*tuto, cito, et jucunde,*" as the old surgeons would have it, much more surely than in the employment of the means lately recommended [1] for cleansing the ulcer, the sharp spoon, chemical agents, such as chlorine water, etc.

I trust that in the hands of my colleagues the results of this method will be equally favorable, and make further words of recommendation from me unnecessary.

Finally, as to the method itself, the application of red heat, two forms of apparatus are at our disposal, not to mention such obsolete means as heated hooks, pin-heads, and graphite pencils: the small galvano-caustic apparatus of Sattler (made by v. Remiger),[2] and the Paquelin thermo-cautery with a specially thin tip. I have tried both, and do not hesitate to give unconditional preference to the former.

The use of the latter is objectionable, partly on account of the greater complication of the technical apparatus, a spirit lamp, continuous blowing, etc., being necessary in its employment, and occasioning great inconvenience to physician and patient; but mainly because we cannot get a white-hot tip sufficiently delicate to allow of the nice manipulation necessary for working in a district of no more than a millimetre in extent.

This neat manipulation is possible only with the galvano-caustic loop, which is brought to a red heat at the exact moment when it is needed, and cools as quickly, and which, moreover, produces no annoying light-effects by the slight glowing of the thin wire.

Whilst I regard the key recommended by Sattler, with a few modifications, as a very serviceable, convenient instru-

[1] Meyhöfer (Görlitz): Observations on the serpent ulcer and on the treatment of corneal ulcers, particularly the serpent ulcer, by scraping with the the sharp spoon, and iodoform.—*Zehender's klin. Monatsbl.*, vol. xxii., p. 151.

[2] The apparatus (modified key with two points and wires), well made, can be obtained from E. Albrecht, Universität Mechaniker, Tübingen, in a case, for 25 marks.

ment, the points recommended by him do not suffice for fine work.

I have had a point made for this purpose which makes it possible to use the handle and point as a lever in the hand of the operator, who can then conduct his manipulations more safely and rapidly. The point is elongated, and is



bent on itself at right angles. The operator holds the instrument, which is connected with a powerful Grenet element, in such a way that the handle rests on some point situated below the eye of the patient, its point at the same time corresponding with the centre of the ulcer. The current is then closed. When the point glows on releasing the button, a slight lever movement is sufficient to press the point rapidly and surely into the tissues to be destroyed, and by a rapid circular movement, without lifting the instrument, the whole border of the infiltration can be destroyed.

The use of this lever action makes this method simpler and safer than direct cauterization, which alone is possible with Sattler's tip.

The exact details each one will learn for himself best and most rapidly after a few trials, which I would heartily and positively urge upon him.

A short summary of the results of various methods of treating destructive processes of the cornea, drawn partly from my own statistics and partly from the essay of Fisch,[1] is here given :

Result.	Incision (113 Cases).	Iodoform (63 Cases).	LinearCauterization (68 Cases).	Galvano-Cautery (100 Cases).
Phthisis	9.7 % (4 %)	6.3 %	1.4 %	0 %
Leucoma adh. . .	26.5 % (22 %)	93.6 %	28 %	3 % Leuc. adh. 9 % Leucoma.
Macula	61 % (70 %)		66.2 %	88 %
Unknown	3.5 % (4 %)	——	4.4 %	——
Duration of treatment	——	20 days.	30.7 days.	13.5 days.

[1] *L. c.*, p. 45.

Further observations must determine if these numbers have constant value; the results of the cases which have since come under my observation are identical with the former.

Let me now give a résumé, such as I have incorporated in the Transactions of the Copenhagen Congress:

(1) The use of the galvano-cautery is always indicated in affections of the cornea which take their origin in mycotic infection.

(2) In such cases it gives the most thorough disinfection of the floor and edges of the ulcer, and, at the same time, stimulates the process of repair.

(3) This process of repair is shown, almost at once, in the increased diffusion power of the corneal tissue, the clearing of the aqueous humor, dilatation of the pupil, and absorption of the hypopyon.

(4) In most cases, also, it does away with the necessity of the corneal incision, because, when the evacuation of the contents of the anterior chamber is required, it can be effected by means of the heated loop. Above all, the cautery can be immediately resorted to when the malignant nature of the process is evident, and accords with the maxim, "Principiis obsta."

(5) The operation causes but slight pain, no assistant is needed, anæsthesia is unnecessary, and the method is available in the treatment of patients at the polyclinics.

(6) A rapid disappearance of the ciliary irritation is almost always observed. The duration of the healing process is considerably lessened. The final result gives a much less extensive and dense opacity of the affected corneal tissue than is found after the use of the other methods.

(7) The mode of applying the heated galvano-caustic loop is exceedingly simple and easy to master.

ACUTE GLAUCOMA CAUSED BY HOMATROPINE.

By FRANK H. HODGES, F.R.C.S. Ed.,

OPHTHALMIC SURGEON TO THE LEICESTER INFIRMARY, ENGLAND.

ALTHOUGH several cases of acute glaucoma caused by atropine have been recorded, there has not been, so far as I know, a single instance resulting from the application of homatropine.

A remarkable point in the case I am about to relate is that the glaucoma supervened twenty-six hours after the instillation of the homatropine, when the maximum effect of the drug must have long passed off.

Miss C., æt. forty-four, sought my advice with reference to spectacles on January 6, 1885. Fourteen years ago she consulted another specialist, who prescribed + 3 D for reading; these she used till six months since, when she exchanged them for + 4 D. With these, 0.5 Snellen is read at twenty-three and fifty centimetres; they, however, cause much aching. Pupils of normal size, and act promptly to light. Tension of both eyes normal; this point I tested with great care, as the patient informed me a brother had gone blind from glaucoma. I proceeded to measure her manifest hypermetropia, by a method which I learned from my friend Professor Tweedy, and which I invariably employ in patients over forty, when the activity of the accommodation is usually much lowered. This consists in placing in a frame before the eyes convex lenses which considerably over-correct the hypermetropia; then holding in front of these weak minus glasses, and increasing the strength thereof till the best distant vision is obtained. But with Miss C. the ciliary muscle, probably hypertrophied from over-use, refused to relax, and I therefore resorted

to homatropine and retinoscopy. Three instillations in each eye of a 2-per-cent solution of homatropine hydrobromate at intervals of five minutes were made, and at the end of twenty minutes I estimated by retinoscopy the hypermetropia at 2 D, with which correction some letters of $\frac{6}{6}$ were read with each eye. The fundus was noted as normal. Spectacles of + 2 D were ordered for constant wear, and the prescribing of reading-glasses deferred for a fortnight.

Miss C. went home, and, contrary to orders, wore her reading-glasses (+ 4 D) the whole evening doing crochet work. About 5 P.M. on 7th January (twenty-six hours after the instillation of the homatropine), she was seized with sudden pain in the left eye, followed in two hours by severe vomiting; about 3 A.M. on January 8th the right eye also became affected. The symptoms began to remit on January 9th, at 11 A.M. When this attack took place, I was in London for the Ophthalmological Society's meeting, and my patient finding me from home sent for her usual medical adviser, Mr. Benfield, to whom I am indebted for further notes of the case. In addition to the symptoms above narrated, he observed that the eyes were intensely injected and chemotic, and that the vomiting was attended with a dry, furred tongue; medicine for the relief of the stomach derangement was prescribed by him.

I did not see the case till 6 P.M. on January 10th; there was then no chemosis, but both ocular conjunctivæ were injected, that of the left eye being more intense than the right; some photophobia was still present, but pain was gone. Tension, R E, = + 1; L E, = + 2.

I dropped into each eye a solution of eserine (gr. ij to the ounce), and prescribed drops of half that strength, to be continued thrice daily.

On January 12th I found both pupils well under the influence of eserine, and the tension normal. With a view of preventing any relapse, I directed the eserine to be used once in the twenty-four hours, at bedtime, for three days.

January 16th.—Tension remains normal. The distance glasses (+ 2 D) were now ordered to be used constantly, but no close work of any kind allowed.

January 26th.—The eyes have now quite recovered their natural appearance; the pupils are of average size, and act promptly to light. T. N. V + 2 D = $\frac{6}{6}$. Field of vision, normal.

I directed my patient to continue to wear the distance-glasses

constantly, but not to read much or do close work of any kind for three months, and on no account to exercise her vision for near objects without reading-glasses (+ 4 D).

From the fact that the outbreak of glaucoma did not occur till twenty-six hours after the instillation of the homatropine,[1] I am inclined to the opinion that the attack was not caused by the blocking up of the angle of the anterior chamber by the mechanical application of the periphery of the iris; but that straining of accommodation to do crochet work when the ciliary muscle was only partially paralyzed by homatropine caused congestion of the whole ciliary region, and so obstructed the normal outflow from the eye.

[1] I usually find that the effect of the homatropine, used as above described, completely passes off in from twenty-four to thirty-six hours.

CONTRIBUTIONS TO THE DETERMINATION OF THE REFRACTIVE CONDITIONS OF THE HUMAN EYE DURING THE FIRST FIVE YEARS OF LIFE.

By Dr. C. HORSTMANN, Berlin.

Translated by Dr. W. B. Marple, New York.

THE study of the development of refractive anomalies in the human eye requires a precise knowledge of its refractive properties during the first years of life. While we have a great number of examinations made upon the eyes of school-children, for the purpose of determining the influences causing myopia, much less study has been devoted to the determination of the refractive conditions in children not yet old enough to go to school.

In order to be able to follow up the development of refraction during the first five years of life, I examined 150 children (300 eyes) carefully with the ophthalmoscope: 50 new-born children; 50 between one and two years of age; and 50 between four to five years. I took my material for the most part from the middle and better classes, inasmuch as it is well known that here myopia is much more prevalent than in the lower classes of society. At the same time I sought to obtain determinations of the refraction of the parents, in order to be able to demonstrate any hereditary influence possibly present.

We already have a number of publications in regard to the eyes of new-born children. The first who took up the subject, more than twenty years ago, was E. v. Jäger.[1] He

found among 100 eyes of children 9–16 days old, 17 hyperopic, 5 emmetropic, and 78 myopic, 48 of the last having myopia of $\frac{1}{12}$–$\frac{1}{6}$. The great number of myopic eyes was remarkable; its cause must certainly be the too great curvature of the lens, since the examination was made without the use of atropia. Eighteen years after Jäger's publications Ely[2] investigated the same subject, his results differing essentially from those of Jäger. Among 154 eyes, under the influence of atropia, he found myopia in 27, emmetropia in 21, and in the remainder, 106, hypermetropia. About the same time I[3] made my examinations on new-born children. Among 40 eyes of children 8–20 days old, treated with atropia, 28 were hyperopic, 8 emmetropic, 4 myopic. The latter refractive condition only amounted to 0.5–1.0 D however. I disovered, moreover, that, notwithstanding the instillation of atropia, repeated several times, it was frequently impossible to obtain a mydriasis *ad maximum*. I must suppose, therefore, that the refraction of the new-born is usually one of hyperopia, since atropine so frequently fails to relax completely the tension of the muscle of accommodation. The results of Königstein,[4] who examined in Späth's clinic, at Vienna, the eyes of nearly 300 new-born children, confirmed the latter opinion. He found not a single myopic eye, and very few emmetropic, while all the others were hyperopic. In very many cases the degree of hyperopia amounted to more than $\frac{1}{12}$; in most, however, to $\frac{1}{16}$–$\frac{1}{20}$. The examinations of Schleich,[5] which he made in the obstetrical clinic of Tübingen, on 150 children during the first eight days of life, agree also essentially with those of Königstein. He found hyperopia in every case without exception. The degree of hyperopia varied between 1.0–8.0 D, the average amounting to 4.4 D. The lower degrees of 1.0 to 2.0 D were observed least; those between 4.0–5.0 D most frequently. G. Ulrich[6] found the structure of the eye of the new-born exclusively hyperopic. Jaunik Bjerrum,[7] on the other hand, observed among 87 children (ranging in age from 7 hours to 14 days) hyperopia of 4.0 D in 44, hyperopia of 2.0 D in 17, emmetropia (including the cases of myopia and hypero-

pia less than 1.0 D) in 23, and myopia in 3. The degree of myopia amounted to 2 D twice, and to 3 D once.

These results of separate observers, differing from one another in many points, caused me to make a new series of examinations of the refraction of new-born children. I examined in the upright image the eyes of 50 children from 8–30 days old, by lamp-light, using my modification of Hirschberg's ophthalmoscope. Some hours before the examination a 1 % solution (in many cases a 2 % solution) of atropia was dropped into their eyes several times, so as to secure as complete relaxation of accommodation as possible, as well as good mydriasis.[*] The children were fastened in a cushion, and leaned by the nurse against her own shoulder, so that the child assumed almost an upright position. Sometimes it was necessary to fix the head lightly, but usually the children gazed quietly into the ophthalmoscopic mirror, so that with careful raising of the upper lid the examination of the optic nerve, together with its immediate surrounding, could be accomplished without particular difficulty.

The determination of the refraction (in which the small vessels coursing from the optic nerve towards the macula, and as near as possible to the latter, furnished the object-points for examination) gave the following results:

M. 2.0 D	in 2 eyes.	H. 3.0 D	in 36 eyes.
E.	" 10 "	H. 4.0 D	" 14 "
H. 1.0 D	" 16 "	H. 5.0 D	" 4 "
H. 2.0 D	" 16 "	H. 6.0 D	" 2 "

The average refractive condition consequently amounted to hypermetropia 2.4 D. In a number of hyperopic eyes the presence of regular astigmatism could be demonstrated; a difference in refraction between the two eyes could be established in only a very few cases, and even then the difference did not amount to 1.0 D. I devoted special care, of course, to the myopic, emmetropic, and slightly hyperopic eyes.

As in the former examinations, I found also this time that the instillation of atropia in a number of eyes produced only incomplete mydriasis, and therefore probably incomplete relaxation of accommodation also. While there was

complete mydriasis in only 8 eyes, with hyperopia of 2-6 D, I found it among the 16 eyes with H. of 1.0 D and the 10 emmetropic eyes, in almost half, viz., in 10 eyes. With a horizontal corneal diameter of 8.5–9.5 *mm.*,[9] the diameter of the pupil *well dilated* amounted to 5–6 *mm.* But in the 18 eyes with insufficient mydriasis, the pupil was only ¾ *mm.* broad. In these cases, notwithstanding the very free use of atropia, the pupil could not be further dilated. This condition occurred always in both eyes, and only in children under 14 days old.

The only case of myopia (2.0 D) found, occurred in a child 21 days old. The horizontal diameter of the cornea amounted to 9 *mm.* in both eyes; that of the dilated pupil to 6 *mm.* Not the slightest abnormity could be observed either in the optic nerve (with the exception of a border of pigment on its temporal side) or in the rest of the fundus. A complete relaxation of the accommodation could be inferred from the dilatation of the pupil.

In 42 cases it was possible to obtain determinations of the refraction of the parents of the children. The father was myopic in 10 cases, the mother in 8, and both parents in 3. Generally in regard to the eyes of the children no hereditary influence could be demonstrated, since the children of myopic parents often presented the highest degree of hyperopia. Compound myopic stigmatism (entirely corrected by a spherical-cylindrical glass, — 3 D comb. cyl. — 1 D) was only found in the father of the single myopic child. This condition was said to have existed in the individual from childhood, and not to have changed essentially. The mother was slightly hyperopic. In this case indeed there could be no doubt as to the existence of a congenital hereditary myopia, transmitted from the father.

The other facts in regard to the eyes of the new-born which Königstein [10] and Schleich [11] have observed I could confirm, so far as they concern the color of the iris, the optic papilla and its borders, the condition of the retinal vessels, and the fundus. On the other hand, I found only in 3 cases the remains of the pupillary membrane; and retinal hemorrhages only twice, in children 8 and 10 days old

respectively, in whose case the labor had lasted very long. These hemorrhages had already begun to be absorbed, and after four days no trace of them could be found. The reason why I could not find this condition more frequently (as the authors above mentioned succeeded in doing) was probably because all the children examined by me were more than eight days old.

The second series of examinations was made on 50 children, 1-2 years old. On account of their restlessness, it was a much more difficult and tedious task than in the newborn. Yet, even here, with patience I succeeded in attaining my object. The instillation of atropia, one or more times, several hours before the examination, always caused a sufficient mydriasis. The diameter of the dilated pupil amounted to 5.5–7 *mm.*, where the horizontal corneal diameter was 10.0–11.5 *mm.*[12]

The results in the 100 eyes were the following:

M. 2.0 D	in 2 eyes.	H. 2.0 D	in 32 eyes.
M. 1.0 D	" 4 "	H. 3.0 D	" 18 "
E.	" 10 "	H. 4.0 D	" 6 "
H. 1.0 D	" 24 "	H. 5.0 D	" 2 "

H. 6.0 D in 2 eyes.

The mean refractive condition was accordingly H. 1.8 D. A difference of 1.0–1.5 D in the refraction of both eyes existed in four children who were hyperopic. Worth noting was the fact that in 3 myopic eyes, 2 of 2.0 D, and 1 of 1.0 D, the first traces of a beginning crescent (conus) could be discovered.

I succeeded in determining the refraction of the parents of 39 of the children: 3 myopic, 5 emmetropic, and 31 hyperopic children. A high degree of myopia was found in the mothers of 2 myopes, while the fathers were emmetropic. In the third myope, the parents were emmetropic, or slightly hyperopic. Of the 5 emmetropic children, once the mother alone, and twice the father alone, was myopic, while the other parents showed normal refraction. In no case were both parents myopic, but in the case of four hyperopic children both parents showed a degree of hyperopia, ranging from low to medium ; 6 hyperopic children had a myo-

pic mother, and 7 a myopic father. The parents of the remainder were either emmetropic or hyperopic.

In these fifty eyes the average refraction had diminished from H. 2.4 to H. 1.8 D; besides, the first symptoms of a developing myopia were beginning to appear. It can be supposed that the disposition thereto was inherited, since in two cases the mother showed myopia of a high degree. Nevertheless, another series of cases proved that this anomaly of refraction, and the disposition thereto, is not always transmitted from parents to children.

In the "*Refractive Conditions,*" published by me in 1879,[13] of the eyes of ninety-six children between one half and one year of age, which I have not made use of in the present tables, there were seventy eyes belonging to forty-two children between one and two years of age (a contradiction,—ED.). Of these fifty-three were hyperopic, ten emmetropic, and seven myopic. I could demonstrate here also, in three myopic children (five eyes), that both parents were near-sighted; in one child (two eyes), only the mother was near-sighted. I nevertheless observed at that time also cases in which the myopia of the parents was not transmitted to the children.

The eyes of fifty children between four and five years of age—in whom accordingly school work had not yet exercised any influence—were likewise treated with atropia some hours before the ophthalmoscopic examination. The mydriasis was in all cases satisfactory; the horizontal diameter of the dilated pupil amounted to 6–7 *mm.*, when the horizontal corneal diameter would be 11–12 *mm.*[14]

The refraction of these cases was the following:

M. 3.0 D	in 2	eyes.	H. 2.0 D	in 26	eyes.
M. 2.0 D	" 5	"	H. 3.0 D	" 16	"
M. 1.0 D	" 6	"	H. 4.0 D	" 8	"
E.	" 13	"	H. 5.0 D	" 4	"
H. 1.0 D	" 18	"	H. 5.5 D	" 3	"

The average degree of refraction accordingly amounted to H. 1.59 D. Differences of more than 1.0 D between both eyes were observed here more than in the younger children. In one case myopia of 2.0 D was demonstrated in the right eye, while the left was emmetropic. Among the hyperopic

children there were three with a difference of 2.0 D between both eyes, and six with a difference of 1.0 D.

In one child with myopia 3.0 D in both eyes, there was at the temporal border of the optic disc a choroidal atrophy with irregular borders; the traces of a similar condition could be seen also in three eyes with M. 3.0 D, and in two with M. 1.0 D. With these exceptions the ophthalmoscopic appearances were normal. In this series of cases we were able to determine the refraction of the parents of forty-one children. The father of the child with M. 3.0 D was also highly myopic, the mother emmetropic. The same condition existed in the parents of one child with M. 2.0 D, while in the case of the second child with M. 2.0 D the parents were both emmetropic, or slightly hyperopic. In regard to the parents of the children with M. 1.0 D, in one case both were myopic, and in another only the mother. Among the parents of the four emmetropic children twice the mother alone was myopic; once the father alone; the rest were emmetropic or hyperopic. The child with emmetropia in one eye, and M. of 2.0 D in the other, had hyperopic parents. Thirty-one hyperopic children had a myopic mother in five cases, a myopic father in three; both parents moderately near-sighted once; all the rest were either emmetropic or hyperopic.

Though the number of emmetropes and myopes in this series had increased at the expense of the hyperopes, the results are, nevertheless, in striking contrast to those of E. v. Jäger.[18] He found among the eyes of one hundred children, from two to six years old, hyperopia in eight, emmetropia in thirty, and myopia in sixty-two. The difference can only be explained by the fact that Jäger had not employed atropia.

In regard to the conclusions from my examinations they were as follows:

The refractive condition of the eyes of the new-born is almost always one of hyperopia; not infrequently there is emmetropia, while myopia is very rarely met with. That former investigators found the latter more frequently can only be explained by the fact that the ac-

tion of atropia on the eyes of the new-born is not always uniform, since it frequently fails to completely relax the accommodation. In a number of new-born children examined by me I could observe this fact. I feel sure, therefore, that the number of cases of emmetropia and hypermetropia of low degree is smaller, and of hypermetropia of higher degrees is larger, than that found by me in this series. After the children are a year old the action of atropia is always sufficient. The refraction from this age up changes in such a way that the number of hyperopic eyes is continually decreasing, and more emmetropia, occasionally, also, myopic eyes of low degree, are found. Yet up to the fifth year of life the great majority of eyes are still hyperopic.

As already mentioned, congenital myopia is found in very few cases. In one case I succeeded in finding it. I probably had to do here with a myopia due to too great curvature, which had been transmitted from father to child.[16] I never saw a myopia due to too long an axis of the eye in a new-born child, while I could demonstrate its beginning already in children who were over a year old. I found it in three children two years of age, and in six who were five to six years old. I was able in all these cases to determine the refraction of the parents. In five cases one of the parents was highly myopic, in one both were myopic, and in the remainder there was emmetropia or hyperopia. I believe, therefore, even if myopia (from the ocular axis being too long) is not congenital, at least the predisposition thereto exists from the beginning, and is frequently transmitted from parents to children. The high degrees of near-sightedness begin to develop before the child is old enough to go to school, while the middle and low grades are apt to appear only after the sixth year. According to the opinion of Tscherning,[17] excessive myopia is not caused by using the eyes for close work; this latter only increases the myopia.

References.—[1] "Ueber die Einstellung des dioptrischen Apparates im menschlichen Auge," Wien, 1861, page 20. [2] Beobachtungen mit dem Augenspiegel bezüglich der Refraction Neugeborener.—*Arch. f. Augenheilk.*, 1880, Bd. ix., page 431. [3] Tageblatt der 53. Versammlung deutscher Naturforscher und Aerzte zu Danzig, 1880, page 256. [4] Untersuchungen an den Augen neu-

geborener Kinder.—*Medicinische Jahrbücher*, Wien, 1881, Jahrgang 1881, Heft 1, page 47. [5] Die Augen 150 neugeborener Kinder ophthalmoscopisch untersucht.—Nagel's Mittheilungen aus der ophthalmiatrischen Klinik in Tübingen, 1882, Bd. i., Heft 3, page 44. [6] Refraction und Papilla optica der Augen der Neugeborenen.—Inaug.-Dissert., Königsberg, 1884, page 9, u. ff. [7] Ueber die Refraction der Neugeborenen.—Ophthalm. Section des internationalen medicinischen Congresses zu Kopenhagen, 1884. (Letztere Arbeit war Verf. nur im Referat zugänglich.) [8] Instillation of Homatropia was tried several times, but without satisfactory result. [9] Vergl. v. Reuss, Untersuchungen vom Einfluss des Lebensalters auf die Krümmung der Hornhaut, nebst einigen Bemerkungen über die Dimensionen der Lidspalte.—*V. Graefe's Arch. f. Ophthalm.*, Bd. xxvi., 1, page 51 u. ff. [10] *L. c.*, page 48 u. ff. [11] *L. c.*, pag. 51 u. ff. [12] *Conf.* v. Reuss, *l. c.* [13] Ueber Refractionsverhältnisse von Kindern.—Bericht ueber die zwölfte Versammlung der ophthalm. Gesellschaft zu Heidelberg, 1879, page 237 u. ff. [14] *Conf.* v. Reuss, *l. c.* [15] *Conf. l. c.*, pag. 20. [16] Laqueur (Ueber Hornhautkrümmung im normalen Zustande, und unter pathologischen Verhältnissen.—*V. Graefe's Arch. f. Ophthalm.*, Bd. xxx., 1, page 104) fand bei einem 4 Wochen alten Kinde vermittelst des Javal-Schjötz'-schen Ophthalmometers einen Hornhautradius von nur 6.75 *mm.*, was für meine Ansicht spricht. [17] Studien über die Aetiologie der Myopie.—*V. Graefe's Arch. f. Ophthalm.*, Bd. xxxix., 1, page 201.

A NEW SELF-REGISTERING PERIMETER.

By Dr. G. MAYERHAUSEN, Munich.

(*With two descriptive cuts on plate iv.*)

Translated by Dr. J. H. Shorter, New York.

THE advantages offered by a perimeter with self-register are too evident to be overlooked.

First. For the great saving of time. Every oculist recognizes the great loss of time in taking a field of vision by perimeter according to the method heretofore in use. It becomes a still more complicated matter when it is a question of mapping out scotoma and various different visual defects. The self-registering perimeter entirely obviates the needless loss of time occasioned by the examiner being compelled for each position to seek out and note with pencil the corresponding point on the chart.

Second. Especially in mapping out complicated fields of vision, the greater exactness of the automatic registering in contrast to the annotation by hand is not to be undervalued. As the self-registration is exactly on the corresponding point of the chart, all sources of error in recording are eliminated.

Third. While taking the field of vision, the physician can direct his attention much more closely to the patient, and thereby control continuously the fixation-position of the head, etc., which last the patient is only too prone to change when opportunity is given him.

Fourth. The duration of the sitting being much shorter,

the patient experiences far less fatigue than in the other case, and by his greater attention aids the examination and furthers its exactness.

On grounds above stated, the construction of a self-registering perimeter must be regarded as a decided step forward. Geo. T. Stevens was the first to construct one, which was demonstrated by our American colleague at the General International Medical Congress, at London, 1881.

Since that time, from the suggestions given, such instruments have been also constructed by MacHardy, Priestley Smith, and Magnus Blix, with more or less important modifications.

A comparative description of these can be spared here, as full descriptions and pictures of them are found in the journals containing the articles concerning them.

My endeavor has been to construct an instrument which, while possessing the highest functional accuracy with the greatest possible simplicity and solidity of construction, together with ease of manipulation, should not vary much in price from that of the ordinary non-self-registering perimeter in use heretofore.

Only when combining all these attributes can the use of the self-registering perimeter become general in ophthalmic practice.

We now proceed to describe the instrument itself. The Arm *A* (plate iv., fig. 1), which is furnished at its extremity *B* with a spring clamp to hold the test object, is by its first portion, which is straight, fitted on the perpendicular axis *C*, and revolves about the latter in such a way that the extremity *B* describes a semicircle with a radius of 30 *cm*.

Fastened to the other (the lower) end of this axis *C* is a cogged semicircle *D*, the teeth of which fit exactly into those of a rack *E*. This rack *E* is screwed fast to a perforated plate *F* in such a way that in any movement of the arm *A* the motion communicated through the semicircle *D*, revolving on the axis *C*, and thence to the rack *E*, causes horizontal rectilinear sliding of the plate *F* from the centre toward either side at will. As the teeth on the semicircle

and those on the rack work into each other, and are of the same size, the measure of the displacement of this plate is, of course, exactly equal to that of the periphery of the wheel passed over in turning.

On the graded arc *J* can be read off in degrees the distance passed over in turning the arm *A*.

This turning is accomplished by means of the double-headed button *K*. The little column *L*, whose upper end is formed by the button, is perforated through its entire length. In this hollow is a movable pin which rests below, by a rounded end-piece, on the spring *V*. Now holding between the middle and index fingers the little column *L*, which forms a single piece with the lower plate of the double button, and pressing on the top plate of the button, which is continuous with and forms part of the movable pin, the spring *V* is lifted from the graduated arc and the arm left free to move. On removing the pressure the spring presses firmly against the under surface of the arc, and thus the arm may be fixed in any position.

The perforated plate *F* supports in the centre a button *G*, terminated at its lower end by the needle *g*. On pressing down the button this needle indicates, in the field-of-vision chart below, the position of the arm *A*, or, in other words, of the test object. On releasing the button, the needle flies back into place by means of a small spiral screw *i*.

This entire mechanism is fastened to the quadrangular frame *N*, the lower part of which is provided with the contrivance for inserting the field-of-vision chart.

This contrivance is in a round setting in a plane parallel to the plane of the frame, and turnable about a point—which point is the centre of the space enclosed by the frame.

The contrivance consists of a ring *O* inseparable from the instrument, turning in the setting, and overlapped at its lower circumference by the border *Q*; also the rounded plate *y*, with three spring clamps *x*, for the purpose of fastening it to the border. The latter has an inner covering of soft, light wood, directly on which the field-of-vision chart lies.

In order to insert the chart, the plate is removed, and the chart fastened to it by two small pins which project from the plate. The little needle holes (*c* and *d*, pl. iv., fig. 2) through the chart, in which the little pegs are inserted, lie in prolongations of the lines marking the meridians 0° and 180° respectively. These pegs fit exactly into two small holes in the rim *Q*, lying diametrically opposite each other. Thereby the entire supporting apparatus of the chart can be revolved, and each meridian from 0° to 359° brought to registration, after the plate has been fastened to the circle by means of the three clamps *x*.

When the arm *A* stands at 0° of the arc *J* the needle *g* is, of course, exactly at the middle point—that is, the centre of revolution of the chart.

In turning the ring *O*, the spring *s* catches from ten to ten degrees with an audible click, so that in taking an ordinary field of vision I have no occasion to lose time in making further entry in the series of successive meridians.

The entire registering apparatus is now made fast to the stout arm *R*, which turns in a circle about a horizontal axis *S*, and bears on the central end an index *M*. This index shows in degrees on the disc *T* the position of the arm.

This axis is borne by the column *T*, which stands fast on the foot-board *Z*.

The arm *R* is turned by one of two cranks, *a* and *b*, through an endless screw *H*, and the pinion wheel *W*, which is firmly connected with the arm and axis. But during these manipulations it is recommended for protection of the instrument to always support the arm *R* by the hand.

The movements of the arm take place by this means with tolerable rapidity. But in order not to have to turn the cranks for so long a time, in the exceptional cases when one wishes to test the visual fields in widely separate meridians, and one has to pass rapidly from one meridian to a distant one, there is a contrivance provided which allows the entire apparatus to be put out of gear in a moment.

For this purpose the endless screw is provided at *m* with

a ball joint. On pulling out the peg *n*, which holds the screw in place, the end of the screw towards the handle *b* is automatically tilted up by a spring *o*, fastened below, and thus displaced from contact with the pinion.

The arm thus becomes freely movable, and can be turned by the hand to the intended position. When in place desired, the screw is again depressed, and the peg pushed home to make it fast.

The chin holder is the ordinary one. The chin support *p* is fastened at any desired height by the screw *r*.

The screw head *S* serves as fixation point for the patient.

The material of which the perimeter is made is, with the exception of the base board, partly iron and partly brass.

With regard to what pertains to the field-of-vision chart, it may be noted that the parallels are at exactly equal distances apart. As has been observed by others, last by Förster, a chart, with the parallels constantly diminishing in distance from each other towards the equator, gives no full, correct view of the inscribed visual field.

The above-mentioned author also makes the suggestion if, instead of marking the meridians from 0° to 180° to each side, it would not be better to number them successively from 0° to 359°.

Regarding it as most practical, I have numbered the meridians on the right half of each visual field from 0° to 180°, then on the left half from 180° to 359°.

The same chart is used for each eye.

The point of fixation lies, of course, in the axis.

Plate iv., fig. 2, presents the chart in its natural size. The meaning of the points *c* and *d* has been already given.

It is certain that a universally used conventional chart, without additional drawing, would simplify very much the description of the fields of vision, as Förster has forcibly remarked.

Finally, I may remark that with regard to the question of the normal boundary of the visual field, it has often occurred to me, if it would not be judicious to construct a new perimeter which would measure to the outer side more than 90°—for example, 100°.

But as our perimeter is designed especially for practical clinical purposes and in this view the accurate testing of the remaining visual field is the important thing, it is a matter of little moment whether the temporal boundary lies somewhat beyond 90° or not. So I have decided not to depart from the usual method in this instrument.

I only add further the notice that in using the perimeter the chart must be always so inserted that the same meridian is marked on this as is indicated by the index on the disc *T* on the axis of the arm *R*—that is, if the index stands at 0° on the disc, the chart must be so situated that the meridian marked 0° must lie directly in front of the patient. If the index, for example, is moved to 20°, the chart must be turned until the 20° meridian is in the place formerly occupied by the 0°.

Although, by reason of the perfection of the instrument, the arm *R* is capable of describing an entire circle and being held fast in any position desired, still it is recommended, as being most convenient in the registration, not to raise the arm outwards above the horizontal.

In taking an ordinary field of vision it is best to select as the point of departure the location of the index *M* at 270°, passing in succession to 280°, 300°, 320°, 340°, 0°, 20°, 40°, 60°, 80°.

The instrument can be had of G. Rodenstock, Munich and Würzburg, for 175 marks.

CONTRIBUTIONS TO THE PATHOLOGICAL ANATOMY OF THE CHOROID.

By Dr. F. DIMMER,

ASSISTANT AT PROF. V. JÆGER'S CLINIC IN VIENNA.

(*With plates iii. and iv.*)

Translated by Dr. Morris L. King, New York City.

I.—*Proliferation of endothelium in a choroidal exudation.*

IN an eye with sarcoma of the choroid, which was removed in May, 1882, at Prof. Arlt's clinic (whose assistant I then was), I had the opportunity for making interesting observations. I will first give a brief history of the case, and then describe the microscopic appearance.

The left eye of a healthy man of forty-eight years had for the past eight years gradually lost the power of vision. Five years ago he had severe pains for two weeks, these disappearing of themselves. Within the last six weeks, however, he had had them again, causing him to seek advice.

On admission, there were amaurosis, conjunctiva injected, somewhat œdematous, the cornea slightly dim, the anterior chamber deep, and the lower part filled with blood; the tissue of the iris was turgid, of a greenish color, and the lens transformed into an opaque yellowish mass. The eyeball was painful to the touch; tension reduced to — T 1. Enucleation was done on May 28, 1882, and the eyeball placed in Müller's fluid.

A later examination showed the presence of a brown nodule the size of a hemp-seed, composed of slightly pigmented, very small, roundish cells; this nodule was situated on the sclera,

about 9 *mm.* behind the lower border of the insertion of the external rectus.

On opening the eye, it was seen that nearly opposite this small nodule there was a similar prominence in the choroid. This also was formed of small, round cells, the central ones only being pigmented. In the vicinity of the optic nerve another brownish growth was seen, measuring about 10 *mm.* across the base. Its most prominent part was just over the papilla, where it projected into the eye about 4 *mm.* At its outer border it dropped off suddenly, but toward the inner side it was gradually lost in the choroid, so that here its borders were hard to define. Microscopic examination showed that it was mainly composed of pigmented spindle-shaped cells lying in a finely fibrillated reticulum. In some places, especially in the vicinity of the optic nerve, there were aggregations of large, round, deeply pigmented cells. Some parts of the growth had degenerated into a finely granular mass, in which, here and there, were seen rust-colored pigment granules distributed irregularly. Wherever the remains of vessels were seen in these growths, their walls were found to be very thin, and crowded with these pigment granules. The limitans of the choroid was in folds over the surface of the tumor, and could be traced to the region of the papilla. In the lower part of the eyeball nothing could be seen of the choroid, over a considerable space, but in its place was a granular, yellowish-white mass, composed of finely granular detritus and numerous round cells. There were no prominent changes in the cornea, and Schlemm's canal could not be found. In the lower part of the anterior chamber there was an accumulation of round cells and red blood-corpuscles, connected with each other by a structureless mass. Excepting the pupillary region, the whole lens was surrounded by a dense connective-tissue exudation. The iris was adherent to the latter. In the ciliary body, and about this exudation, and behind the lens, were found large round masses of pigment, in which no nuclei could be discovered. The ciliary body was separated from the sclera by a homogeneous mass which contained only a few irregularly distributed cells. From the centre of the swelling, just over the papilla, the retina projected as a thin cord. Its smallest diameter was at its centre (1.5 *mm.*), expanding but little behind, but assuming a cone shape anteriorly. On arriving at the posterior pole of the lens, it became continuous with the exudation which has been mentioned, covering the pos-

terior surface of the lens. In transverse section could be recognized the folded remnants of the limitans, and numerous vessels with greatly thickened hyaline walls.

Even macroscopically we could discern an unpigmented layer, about 0.75 *mm.* in thickness, lying on the inner surface of the tumor, and covering it in its whole extent. At the inner part of the eyeball, where the tumor merged into the somewhat thickened choroid, this layer was separated from the latter by a layer of structureless material (coagulated fluid). Not until it reached the region of the ora serrata did it again become united with the choroid, and was merged into the exudation covering the inner surface of the ciliary body. This choroidal exudation was composed of wavy connective tissue, and on its external surface, which faced the limitans of the choroid, were found remains of retinal epithelium, partly pigmented and partly not. We will again refer to this point. In the vicinity of the papilla it became considerably thickened, so that the transition into the cord formed by the detached retina was quite gradual, rising in a slightly curved line.

Even with low powers we could easily see that it contained peculiar fissures, particularly near its outer surface. These were very long, extending mainly parallel to the surface of the membrane, or only slightly obliquely to it. It was only occasionally that such fissures were seen near its inner surface, but they were particularly numerous where the detached retina passed away from the connective-tissue exudation; they could even be seen although quite rarely on the outer surface of the latter, near its origin. In the two locations just mentioned their direction was quite irregular, but at the same time they were occasionally inclined toward each other, so that they seemed to be arranged like the crystals of an excrescence.

The length of these fissures was about 0.12 *mm.*, and they were filled with a homogeneous substance which took up carmine coloring to a slight extent. Their walls were lined with masses of varying thickness on cross-sections of the exudation, of spindle, bulbous, or columnar shape, and homogeneous under a low power. Only when examined with higher powers (fig. 1) was it possible to discern that these growths were composed of cells packed closely together. Their nuclei were large (from 0.003 to 0.008 *mm.*), oval, the protoplasm being scanty. Half of one or the other of these cells extended into these fissures. Often it was not

possible to distinguish the cell borders, and even when this could be done, we could only see a mass of protoplasm filled with numerous nuclei. It also sometimes contained scattered pigment granules. Even when the fissures were close together, the intervening space in cross-section was not always entirely filled with these masses of cells, but a portion was often occupied by wavy connective tissue. This was also the case where single fissures appeared in the exudation separated from the others. In longitudinal sections, which were made by teasing the exudation, one could also see similar long fissures surrounded by masses of cells. Often in these, also, no connective tissue was seen between them. The partly long and partly round cells were then usually very large (fig. 2).

The question now was: How should this condition of things be interpreted? It could not possibly be a proliferation of sarcoma into the exudation, because the formations above described were found outside of the intact limiting membrane of the choroid, and frequently in the periphery, entirely without any connection with those found in the vicinity of the optic nerve. It is much more probable that the cell-masses lining the cavities originated in the connective-tissue cells of the endothelium.

The membrane in this case was probably formed after the retina had become detached, because if it had been otherwise, adhesion between the choroid and retina would have resulted. In the exudation, therefore, it led to a proliferation of the endothelial cells. These produced the above-mentioned formations resembling giant-cells, and the fissures situated between the bundles of connective tissue became wider.

RANVIER, KUNDRAT, and others have shown this to be true of the endothelium of connective tissue and of serous membranes. They also mention the formation of giant-cells, and although the occurrence of such proliferations has often been described, I do not know that it has been observed in this manner in a newly formed membrane lying on the choroid. The pigment granules found in some of the proliferated cells must be considered as having been derived from the remains of the pigment epithelium which will be

described immediately, especially as they were only found in its immediate vicinity.

II.—*On the origin of the colloid excrescences of the choroid.*

The microscopic examination of this globe disclosed an interesting state of affairs in still another respect. In cross-sections, a pigmented layer could be seen in many places over the limiting membrane of the choroid. In many places this was next the hyaloid membrane, but occasionally a thin, structureless layer was seen between them, consisting apparently of a coagulated fluid. Lying on the limiting membrane and projecting into the exudation, were a few small hyaline deposits, of a roundish, well-defined shape—the so-called colloid excrescences of the hyaloid membrane. But in the region of pigmented cells, and surrounded by them, there were seen numerous hyaline or finely granular bodies of roundish, well-defined shape, resembling closely the colloid excrescences. They were less numerous and smaller in the posterior part of the globe over the tumor, but in the anterior part more numerous and larger. In the posterior part fewer pigmented masses were to be found.

Surface preparations were made wherever the exudation was thin or could be separated into layers. In these we could see the pigment occasionally collected in large masses.

These round masses often had a diameter of 0.55 *mm.*, but no further structure was recognizable. Between them were found large spindle-shaped and round cells, in which the non-pigmented nuclei were distinctly visible. This distribution of the pigment was the cause that at the spot first mentioned, where the membrane was raised from the choroid, a very fine dark stippling was visible with the naked eye. Between these pigment masses and cells, and occasionally surrounded by them, were found the hyaline or finely granular masses—the colloid excrescences seen in cross-section.

On closer examination of the outer surface of the loosened membrane, I found cells which, though only slightly pigmented, from their angularity and relation to each other, could not be considered to be any thing else than changed epithelial cells ; they did not form a continuous layer, but were deposited in large groups. The diameter of these cells averaged 0.015 *mm.*, and they contained one and often two nuclei, which stained easily with hæmatoxyline. Among them and in their vicinity were

granular and round cells, and others greatly increased in size, either not at all or but slightly pigmented. Where pigment was still present, it took the shape of large masses whose color was considerably lighter and somewhat more reddish than that of normal pigment (fig. 3). In the non-pigmented cells the nucleus was often, at the edge, very pale and hardly visible (fig. 4). In some places many such cells were closely heaped together. In some of them no nucleus at all was recognizable. Farther on the transition to the wholly hyaline bodies (fig. 6) was formed by grayish granular masses, in which or at whose edges could be seen the remains of the borders of the cells of which they had been formed (fig. 5). The larger hyaline bodies referred to were distinctly arranged in layers, in so far that a sharply defined hyaline central portion was surrounded by a thinner finely granular stratum (fig. 8). The contours of the central parts were sinuous, and in them were frequently scattered numerous small light reddish-brown pigment granules.

In the same manner, but with greater ease and certainty, I could trace the origin of the colloid excrescences in another case. This occurred in the eye of a man forty-five years of age, who fifteen years previously had lost the sight of the right eye without known cause. The globe afterward often became painful, and this circumstance caused him to apply at the clinic for admission, and to consent to the removal of the eye.

In the amaurotic eye there was ciliary injection ; tension diminished to — T 1 ; the cornea dimmed and its surface stippled. The anterior chamber had disappeared entirely. The thinned, atrophic iris rested against the cornea above. In the lower part only traces of the iris were visible. The lens, opaque and of a yellowish-white color, lay at the bottom of the anterior chamber, nearly touching the posterior surface of the cornea.

After opening the globe the following state of things was found : The whole lens had undergone calcareous degeneration ; the retina was totally detached, and in it, as well as on the choroid in the vicinity of the papilla, ossification had been going on. Scattered over the whole choroid, particularly numerous in the anterior parts, were large and small so-called colloid excrescences of the choroid, some of them 0.2 *mm.* high. Pigmented flat and round cells, as well as irregular masses of pigment (fig. 7), were seen on and under them, and also surrounded by them. The excrescences themselves were arranged in distinctly concentric

layers, the inner ones homogeneous, of a glassy appearance, with sinuous sharp edges, the outer ones granular. Occasionally radiating striation was observed in these latter, the granules showing a stellate arrangement (fig. 9). On surface preparations the same changes in the pigment epithelium as in the case previously described were discernible. In several small, circumscribed, and larger spots the cells had lost their color, or the pigment was contained in larger, paler, reddish-brown granules (as in fig. 3). The cells had become rounder, larger, their nucleus pale and frequently eccentric in position. These cells had become agglutinated and coalesced, forming the smaller excrescences, in which remains of the cell borders were occasionally visible (fig. 10). The larger ones only showed the same stratification as that described in the first case.

The cells in the vicinity which still contained pigment had either become crescentic (from pressure), or there was an increased accumulation of pigmented cells and pigment masses. The first often contained two or more nuclei. In the posterior parts of the choroid, where ossification had been going on, the excrescences were surrounded by the osseous mass (similar to that shown by A. Meyer in *Arch. f. Ophthal.*, vol. xxiii., 4, plate v., fig. 31).

The colloid excrescences were first described as senile changes, and these were observed in acute and chronic inflammations of the choroid.

WEDL[1] describes them as colloid bodies of the choroid, but does not express a definite opinion as to their origin-only mentioning their analogy to the colloid masses in the thyroid gland.

DONDERS[2] expresses the opinion that they are the result of a colloid degeneration of the nuclei of the pigmented epithelial cells.

H. MÜLLER[3] considers them thickenings of the hyaloid membrane. He thinks that they are an *excretion* from the cells of the pigment epithelium.

RUDNEW[4] advances still another explanation. He sup-

[1] Pathological Histology.
[2] *Arch. f. Augenheilk.*, Bd. i., 2.
[3] *Arch. f. O.*, Bd. ii., 1.
[4] *Virchow's Arch.*, Bd. liii.

posed they were formed from white blood-corpuscles, which had emigrated and had undergone retrogressive metamorphosis. He supposed they had formed under the limiting membrane, through which they afterward penetrated.

LEBER, in his work on the amyloid degeneration of the conjunctiva,[1] and also later,[2] remarks that the formation of concentric excrescences of the hyaloid membrane can be explained most easily as being analogous to that of the cuticular formations, which are due to a cellular exudation at their surface.

SATTLER[3] mentions hyaline exudations on the inner surface of the hyaloid membrane, which take place in acute suppurative inflammation of the choroid. These exudations "are at first flat, slightly wavy, and raise the layer of pigment epithelium; later on there appeared on their surface globular or semi-globular excrescences, with either broad or constricted basis." Regarding their relation to the pigment epithelium he says: "I could never demonstrate a transition from cellular elements into such hyaline formations, and I believe that this process is but a rapid development of those excrescences whose slow growth is so common in old age."

WECKER[4] believes "that it has already been shown that the retinal epithelium does not take part directly in the production of these excrescences. Proliferation of the pigment epithelium is often noted simultaneously with an excessive development of these excrescences, but the view once expressed by Donders, that they are the result of colloid degeneration of the nuclei of epithelial cells, is no longer accepted." Besides considering the thickening of the hyaloid a senile process, Wecker also thinks it a peculiar disseminated choroidal inflammation, localized on the hyaloid membrane. He also mentions that these growths are often detached from their base and penetrate into the retina as far as the layer of nerve fibres. Their presence in the optic papilla was also mentioned by Iwanoff,[5] who ex-

---

[1] *A. f. O.*, vol. xix., I.
[2] *A. f. O.*, vol. xxv., I.
[3] *A. f. O.*, Bd. xxii., 2.
[4] Graefe und Saemisch, Bd. iv.
[5] *Zehender's klinische Monatsbl.*, Bd. vi.

plains it by saying that they had become detached from the layer of pigment epithelium.

ADOLF MEYER[1] endeavors to show that the colloid excrescences of the hyaline membrane are a product of the cells of the pigment epithelium, ALT[2] observes that the latter seems to be the most satisfactory explanation; cases are sometimes observed in which the excrescences seem to have been the direct result of degeneration of the pigment epithelium.

DE VICENTIIS[3] believes that these formations arise from a colloid degeneration of the contents of the cells of the pigment epithelium, but does not furnish any proofs for this.

In describing the anatomical condition of an eye operated on by Critchett for staphyloma of the cornea, DA GAMA PINTO[4] mentions some colloid excrescences, separated from the limiting membrane by a double or triple layer of cells, which he considers products of the proliferated pigment epithelium. From the specimens examined he could not decide whether the degeneration proceeded from the nuclei or the protoplasm of the cells.

In considering these excrescences of the choroid, it seems remarkable that they always develop only on the side towards the retina. If we regard them only as thickenings of the latter, this would demand explanation, because the limiting membrane of the choroid is not like that of Descemet, with one surface turned towards a cavity, where the conditions for proliferation of excrescences on that one side might be more favorable. We might, at least, expect that the thickenings would extend both towards the retina as well as towards the choroid. If it could be shown that these excrescences were formed by a peculiar condition from, or a degeneration of, the pigment epithelium, then their presence only on the inner surface could be easily explained. From this would follow that these formations could also be formed from pigment epithelium, when the latter is acci-

[1] *Arch. f. O.*, Bd. xxiii., 4.
[2] Patholog. Histologie.
[3] *A. f. O.*, Bd. xxviii., 1.
[4] *Movimento med.-chirurg. Estratto*, 1874, citirt nach *Nagel's Jahresbericht.*

dentally or otherwise detached from the hyaloid membrane. We could also assume that these growths might be formed in the retina itself, if cells of the retinal pigment emigrate into the retina. We see, therefore, that the presence of such hyaline bodies in the retina cannot always be explained by detachments from the limiting membrane of the choroid, but that they also may be formed *in situ*.

The assumption that these excrescences are formed from the pigment epithelium, was advanced, as has been mentioned above, by Müller, Meyer, and others, but their formation from cells was denied.

From the facts found in the two cases mentioned, it seems to me to be proven that the well-known excrescences on the choroid *may* arise from cells, in that the interior of the cell becomes filled with a transparent, homogeneous, or slightly granular substance, which either fills the whole cell, or pushes the nucleus to one side. During this process the cell becomes swollen, its contour rounded, the nucleus indistinct, and at last disappears entirely. By gradual coalescence, these enlarged cells form the colloid excrescences of the choroid. The process is similar to that of simple colloid degeneration.

Donders thought that the excrescences were the result of colloid metamorphosis of the nuclei of the pigment epithelium. But in our two cases, at least, it seems to us that they were formed by the whole cell undergoing a change similar to that of colloid metamorphosis.

The view that the excrescences are formed from an excretion of the cells on the limiting membrane, thus raising the pigment cells, seems to be supported by the fact that pigment cells are occasionally found on the excrescences. It also seems quite probable that there is a proliferation of pigment cells in the vicinity of the excrescences, because the cells frequently contain two or more nuclei. This renders it possible for pigment cells to be found superimposed on the excrescences, in that the growing mass pushes its way beneath the neighboring pigment cells, or the degeneration only affects the central parts of an adjoining mass of cells.

In the second case one could observe (as has also been shown by Donders) that pigmented epithelial cells are also formed (fig. 7) under the excrescences, so that the latter often seem to be surrounded by them. This would be very difficult to explain, if the excrescences were excretions of the cells on the hyaloid membrane.

To account for the remarkable size of some of these formations we must either assume that they have the property of greatly increasing in size by imbibition, or that an amorphous mass is formed from the animal fluids, accumulates about the nucleus of metamorphosed cells, and assists in increasing the size of the excrescences. I cannot omit to mention that the striation seen in figs. 8 and 9 gives the impression that it is partly caused by the contraction and condensation of the central parts; the peculiar outlines of the latter render this supposition probable, as the various shapes can be best explained by a supposed contraction of the centre. For the same reason, perhaps, this separation into layers is only seen in the larger excrescences, while the smaller ones are of a finely granular structure, seen only in the outer layers of the larger ones.

Most authors consider the colloid excrescences of the choroid merely an incidental secondary change. LEBER, on the contrary, is inclined to look on them as of more importance. He raises the question whether the changes of the epithelial layer (proliferation of cells, disappearance and new formation of pigment) are not caused by the growth of the colloid excrescences. He also mentions the fact that the sclerosed walls of the vessels, around which pigmented cells had accumulated, very much resembled the colloid excrescences.

If the latter, as in our cases, originate in the pigmented epithelial cells, then they are the result of a retrogressive metamorphosis of these cells, which opinion is confirmed by their occurrence in old age. In their vicinity there could also be a secondary proliferation of the pigmented epithelial cells, the products of which could also undergo degeneration, thus again increasing the size of the vesicles.

In closing I fulfil a pleasant duty in thanking Professors

WEDL and FUCHS for the inspection and approval of a part of the specimens.

Explanation of Figures on Plates III. and IV.

FIG. 1.—(HARTNACK, Ocular 3, Obj. Immers. 9.) Transverse section through the choroidal exudation, showing the cells lining the fissures.

FIG. 2.—(HARTNACK, Ocular 3, Obj. Immers. 9.) Masses of cells on the surface of a specimen of the exudation.

FIG. 3.—(HARTNACK, Ocular 3, Obj. Immers. 9.) Enlarged cells of pigment epithelium, which still contain some pigment.

FIG. 4.—(HARTNACK, Ocular 3, Obj. 8.) Non-pigmented round cells with pale nucleus, which have originated from those shown in fig. 3.

FIG. 5.—(HARTNACK, Ocular 3, Obj. Immers. 9.) A finely granular mass composed of closely aggregated degenerated cells, whose borders can still be partly recognized.

FIG. 6.—(HARTNACK, Ocular 3, Obj. Immers. 9.) A finely granular mass without any further structure.

FIG. 7.—(HARTNACK, Ocular 3, Obj. 5.) A large excrescence of the choroid arranged in layers.

FIG. 8.—(HARTNACK, Ocular 3, Obj. 7.) Smaller excrescence seen from the surface.

FIG. 9.—(HARTNACK, Ocular 3, Obj. 7.) Two similar ones with radiating striation in the peripheral layers.

FIG. 10.—(HARTNACK, Ocular 3, Obj. 5.) Single degenerated cells with others which have already coalesced, forming larger bodies.

REPORT OF CASES OF CONGENITAL ANOMALIES OF THE EYE.

BY DR. F. DIMMER,

ASSISTANT AT PROF. V. JÆGER'S CLINIC IN VIENNA.

(*With two colored plates v., vi., and fig.* 3 *on plate vii.*)

Translated by Dr. MORRIS LEE KING, New York.

IN the following pages we will describe the opthalmoscopic appearance of several cases, doubtlessly congenital anomalies, which may create a general interest.

The first case is that of a young man, both of whose eyes, on ophthalmoscopic examination, presented a very peculiar appearance. He was a young student of the Talmud from Russia, about twenty-four years old, of weakly appearance, who presented himself on July 14, 1883, at the clinic of Prof. Arlt (whose assistant the author then was). He came to get advice about his right eye, which, about seven months previously, had, without apparent cause, begun to fail. At first he only noticed a cloud, which, however, disappeared after the lapse of a month. The gradually increasing loss of vision, which soon made it impossible to read, caused him to seek relief. Three years ago he had accidentally noticed that the vision of the left eye was very poor, but had not consulted a physician at that time.

The external parts of both eyes are apparently normal, and when fixing nothing abnormal is noticed. Examination with the ophthalmoscope revealed the following condition :

Left eye (plate v., fig. 1[1]) : Only the inner half of the papilla is

[1] The numbers in figs. 1 and 2, and in the text, give the refraction of those spots in dioptries.

distinguishable; over this is a large vein, and several smaller vessels pass inward. At the lower inner edge there is a small, annular, shining spot. The outer half centre of the papilla is covered with a light whitish-gray mass, which extends outward about 2½ P. D.[1] In shape it is very much like a tent, as it seems to be resting on the papilla and retina, and projects into the vitreous humor. The most prominent part (+ 3.5 D.) lies over the lower outer part of the papilla and the adjacent part of the fundus. It is of a trapezium shape, with the longer side extending from the inner upper to the lower outer part; it is of a light whitish gray color, with a bluish tinge, has an asbestos lustre, an irregular margin, and an uneven surface, which seems to be composed of numerous fibres, interwoven with each other. Somewhat above the centre there is a triangular plate (of the same color), which gradually becomes thinner and more transparent, until extending downward, forward, and somewhat outward, it ends in a fine sharp point (+ 8 D.). From all four corners and sides of the trapezium, numerous fine (by transmitted light gray) striæ radiate in all directions, forward also. (+ 8 and + 9 D.). These, therefore, enclose a funnel-shaped part of the vitreous humor, the mouth of the funnel being nearest the pupil. From all four corners of the most prominent part of the deposit, outward, downward, inward upward, and inward downward, grayish, membranous, transparent projections extend toward the fundus, somewhat like the seams in a tent-roof, and insert themselves at varying distances (up to 3 P. D.) from their origin in the retina. They do not begin at the level of the prominent mass spoken of, but at a somewhat deeper level, so that it would somewhat resemble a button, with a slightly contracted base. The process projecting outward gradually slopes away above, but its lower concave edge (convexity upward) projects in shape of a crescent, so that when the eye is rolled upward one can see underneath it. The whole projection is of nearly the same color and has the same surface as the quadrangular mass from which it springs. Through the superficial layers of the slope which passes upward, a fine blood-vessel can be seen running outward. On the prominent edges of the remaining membranous projections there are numerous fine vessels which finally pass into the fundus as retinal vessels. While they run in the projections just mentioned, they are crossed and accompanied by grayish-white striæ which seem to be thickenings of the membrane. In the process extend-

[1] P. D. = Diameter of papilla.

ing inward and downward are a small artery and vein ; in the lower one a small vein ; and in the one extending inward and upward there are several fine vessels, but whether arteries or veins cannot be decided. Above, just under the edge of the white mass, are seen two larger vessels, an artery and a vein. The latter passes toward the centre and can be traced on the tent-like growth, where it can be seen with + 1.5 D., and then disappears under the edge of the white quadrangular swelling. The lower process seems to arise from a yellowish-white linguiform spot, pointing downward and lying at the level of the fundus. This spot is about 2 P. D. long. Only its outer part, surrounded by a black pigmented margin, is visible, the inner part being covered by the grayish membrane of the projections. From the lower parts of this spot two finer vessels arise, and pursue their course close together within the membranous projection in an upward and forward direction. The lower one is a vein, the upper one an artery. After having run forward to a point where they can be seen with + 1 D., they turn outward and pass downward on the membranous process, and finally join the retinal vessels. The upper end of the bright spot lies close under the lower crescent-shaped edge of the outer process. In the angle between the two, a small, round, white spot is seen, of about double the diameter of one of the larger retinal vessels ; it has a slightly dark centre. It reminds one of the bright spot on the inner and lower edge of the papilla, which has already been mentioned. Externally to and at equal distances from the first are seen two similar bright round spots, but they are only indistinctly visible through the projections from the external membranous process. All three are at the level of the fundus, which latter shows a myopia of 1.5 D. A fourth spot, similar to the preceding ones, lies above the artery, which runs upward and outward. Quite a number of small black spots are seen internally, ranged in a semicircle about 2 P. D. from the papilla. The remainder of the fundus is of an even red color in its upper parts, but below and inward the choroidal vessels show through the pigment epithelium.

The right eye (plate v., fig. 2).—In the posterior cortical layers of the lens are seen several very fine opacities. Far in the periphery on the inner side a web-like grayish membrane is visible, which seems to be directly behind the lens. It is slightly tremulous. In the vitreous humor are seen some very fine punctate turbidities and some coarser flaky floating ones.

The papilla is not to be seen. From the point where it may be looked for a bright, bluish-white, conical mass projects diagonally inward and forward toward the edge of the lens. The myopia of the fundus is about 2 D. The membranous projections arise from it (as in the left eye) throughout the whole external and the lower internal portions ; the internal one can only be partly seen above the upper edge of the conical mass mentioned above. Around the base of the latter the retina is detached for a considerable distance, and is of a grayish-red color. The retinal vessels arise, at a considerable distance apart, from the bright cone, at about the same height, and ramify partly in the detached retina, and partly within the projecting edges of the membranous processes. The bright conical projection gradually merges into the detached retina, the transition being rather abrupt above, while retinal vessels are seen coming from under its somewhat overhanging edge and ramifying in an upward direction. The cone passes into the inner projection with a sharp curve, concavity inward. At this point vessels ramify into the retina. At this part of the upper surface of the cone are seen many small, bright, white spots, and a fine grayish transparent stripe (not shown in the cut), which passes through the vitreous humor in an outward, upward, and forward direction. Not far from its anterior end there is a small spindle-shaped swelling (+ 10 D.). The detached retina is not distinctly tremulous. Immediately below it is seen a white stripe running outward and downward. Laterally from the region of the papilla —apparently in the retina—is a small white spot with a dark centre. 3–4 P. D. outward from the base of the cone which extends into the vitreous (taking the left papilla as an approximate measure) are seen a number of indistinct annular reflexes ranged about the region of the papilla, in crescent shape, which change their position and shape on moving the mirror.

Just to the inward from one of these, at the level of the fundus, lies a whitish spot with a darker centre. Similar spots are visible downward and inward where they are nearer, and downward and outward where they are farther from, the papilla. In the region of these reflexes the detached retina seems to gradually pass to the same level as the fundus. Just external to this, and also above the region of the papilla, are seen several irregular dark spots arranged in a manner similar to that of the reflexes.

With the right eye fingers are counted at a distance of one metre, and with the left one at a distance of two metres.

The measurement of the visual field with Förster's perimeter resulted as follows:

In the left eye (plate vii., fig. 1) there is a sector-shaped defect in the visual field in the upper portion, from the apex of which two smaller wing-like defects extend outward and inward. In the right eye (plate vii., fig. 2), just external to and very near the point of fixation, is a limited irregular defect, ending outwardly in a long, narrow point. In its vicinity the visual power is decreased, but not entirely lost, the white square on the perimeter being seen indistinctly (indicated in the cut by fainter shading). The periphery of the visual field is normal. The tension of both eyeballs is the same.

Both cases are apparently congenital anomalies. The ophthalmoscopic appearance reminds one, in some respects, of those described by Eversbusch.[1] As in the case described by him only part of the papilla could be seen in the left eye. In Eversbusch's case also, part of the retinal vessels appeared to come from a cord projecting into the vitreous humor, and passing over a bladder-shaped formation, lying in front of the lower part of the papilla and the neighboring fundus, into the retina. External to the papilla there was a sharply defined zone of a yellowish-white color, about ⅓ P. D. wide, and 1½ P. D. high. In the case described by me, this corresponds to a spot of the same color, lying external to the left optic nerve, and from which one of the membranous formations arise, from which vessels spring, which, after having run some distance in and upon the gray membrane, ramify in the outer portion of the retina.

In the right eye there was also a cone projecting into the vitreous, ending in several whitish-gray processes extending into the retina. In this case the papilla was entirely covered, and the retina detached.

To the analogous anatomical and ophthalmoscopic results given by Eversbusch (*l. c.*) may be added another similar case described by Hersing at the fifty-sixth meeting of German naturalists and physicians, in which (as in E.'s case) the cord could be traced to the posterior pole of the lens.[2]

---

[1] Mittheilungen aus der Königlichen Universitäts-Klinik, München.

[2] *Centralblatt f. Augenheilkunde*, Nov., 1883.

Eversbusch explains his case by assuming that, at the time the vitreous humor was yet present in but small quantity, certain changes, inflammatory perhaps, had taken place in the walls of the hyaloid artery, causing a thickening of the latter, and adhesion of the degenerated cord with the capsule of the lens. This thickened, degenerated hyaloid artery, extending from the optic papilla to the posterior pole of the lens, tended, of course, to prevent the natural growth of the vitreous humor.

With the increase of the latter the central part of the retina and the vessels connected with it was drawn forward by this hyaloid artery, which was attached to it, and formed the tent-like prominence seen in the cut.

Our case is different from that of Eversbursch, in that the remains of the hyaloid artery cannot be traced to the lens in either eye. We should, therefore, be obliged to also assume that at a later stage, after the tent-like expansion of the hyaloid artery into the retina had been completed, its connection with the posterior pole of the lens had been broken, so that only a conical projection into the vitreous humor was left, which also may have shrunken.

The bright spot surrounded by pigment, seen in the left eye below and external to the papilla, must be considered a rudimentary coloboma of the choroid. Above, there is also a sector-shaped defect in the visual field of this eye, indicating that the lower part of the retina did not fully develop. The remaining peculiarly shaped defect of the field about corresponded to the extent of the growth lying in front of the retina.

Formerly the patient was able to read with the right eye. Therefore part of the changes which were found must be considered as pathological. It seems to me to be very probable that the diminution of vision was due to the detachment of the retina which took place only seven months previously. How this occurred cannot be explained with any degree of certainty. The floating opacities in the vitreous of this eye allow us to assume that there was some later change in the vitreous combined with a further shrinkage of the hyaloid artery which brought about the detachment of the retina.

I cannot interpret the numerous round, white spots with darker centres which were so numerous in both eyes. It should be mentioned that it seemed as if the darker parts corresponded to a small depression, because they were very similar to the normal macula lutea in many eyes. In these light spots also the dark centre changed its position when the mirror was moved, but the whitish ring was not converted into a crescent.

The second case was that of a female aged twenty-nine years. She stated that about nine months previously she was lying on the right side of the face when she noticed that she saw very poorly with the left eye. She thinks she has since noticed that the left eye is dazzled by light, and that its vision has decreased somewhat.

In the right eye nothing abnormal is seen.

The anterior portion of the left eye was entirely normal, except that there is a small brown speck of pigment on the anterior capsule just internal to the centre of the pupil.

The ophthalmoscopic examination shows a very remarkable condition of things (plate vi.). The papilla is peculiar, in that it has hardly any blood-vessels. Close to its inner edge a thick artery and a narrower vein emerge. From this point they run forwards into the vitreuos humor and form a loop, the most anterior point of which can be seen with + 1. 5 D. They then again descend to the level of the retina and pass upward within it. The beginning of these two vessels, which seem to emerge from the papilla in an oblique direction, can be indistinctly seen passing from the inner edge of the papilla towards its centre. Besides these, a large vein begins at the inner edge of the papilla. Beneath this and several other smaller vessels which pass inward, is seen a whitish, sharply defined band, extending diagonally from above and outwards downwardly and inwardly. On the papilla itself only one small blood-vessel is visible, whose connection with the arteries or veins ramifying above cannot be made out. It terminates upon the surface of the papilla near the outer edge.

Proceeding from the papilla, and partly covering its lower edge, is a very delicate membrane with grayish striæ, on which rests the loop formed by the vessels described above.

Bluish-white bands emerge from within and pass downward, inward, and forward into the vitreous. One of them extends upward and outward, and when seen from in front forms a crescent-shaped

growth lying on the inner side of the papilla, with its convexity inward; its upper end extends farthest forward (+ 8 D.). The remaining white bands can still be distinctly seen with + 2. 5 D. at a distance of 2–3 P. D. below the papilla. Below the optic disc they diverge, leaving a circular opening between them, through which the red fundus and several blood-vessels are visible, whose origin and course cannot be distinguished. Several smaller blood-vessels are seen external to the whitish bands which form the outer boundary of the round opening, lying in the retina and passing outwardly. At a distance of more than 3 P. D. from the lower edge of the optic disc a large artery, accompanied by a larger vein (+ 3 D.), emerges from the membranous net-work lying in the vitreous humor, which net-work rises from the retina even at a considerable distance from the papilla. These blood-vessels descend over the latter and ramify in its outer portion.

Beneath them (in the retina) are seen several bluish-white branching bands, apparently cicatricial. In the lower inner part, the membranes which arise from the retina and lie in the vitreous assume a peculiar configuration resembling lattice-work, so that round or oblong openings exist, through which the fundus is visible. The latter appears rather of a yellowish than of the usual red color. The pigmentation is very irregular, and occasionally choroidal blood-vessels can be recognized with great distinctness. In the lower part the grayish-white masses gradually slope away into the retina. In the inner and lower part, however, they extend very far forward, and in the outermost parts of the periphery accessible to the ophthalmoscope a large, very light, nearly whitish spot is seen through the open spaces, whose outer edge is formed by a well-defined dark line.

The tension of the eye was normal. Fingers were counted at a distance of two metres. In the upper and outer part of the visual field there was (plate vii., fig. 3) a large triangular defect extending nearly to the point of fixation.

The above-described condition of things cannot be considered as any thing else than a congenital anomaly. In the literature of the subject I am unable to find any thing analogous to it.

In many cases of coloboma of the choroid and the vitreous, there were tendinous cords, arising from or just below the optic disc, extending to the lower edge of the lens and

lying in the vitreous fissure. They have been compared to the crest in the eyes of birds.[1] My case reminded me in some degree of those referred to.

Even in the places not covered by these membranous growths, the retina was not developed normally. If it had, the defect of the whole field of vision, corresponding to the whole lower part of the retina, could not be explained. The choroid must be present, though perhaps not fully developed, because of the choroidal blood-vessels seen in the periphery. It only seems to be wanting in the very bright spot lying in the periphery.

The whole must probably be considered the remains of the embryonic connective tissue developing into the vitreous humor, in the ocular fissure, which has never fully closed. The peculiar origin of the retinal vessels is remarkable, as they arise partly at the edge of the papilla and partly from the membranes lying in the vitreous.

The origin of the latter blood-vessels can only be guessed at. There is nothing to support the view that they originate in the choroidal blood-vessels, and considering the great distance from the papilla at which they appear, it is not very probable that they come from the central retinal blood-vessels.

---

[1] Stellwag: *Zeitschrift der Gesellsch. der Wiener Aerzte*, 1854. And Wallman: *Zeitschrift der Gesellsch. der Wiener Aerzte*, 1858.

STUDIES ON CHROMATOKINOPSIAS.

By Dr. G. MAYERHAUSEN, Munich.

Translated by Dr. C. Zimmermann, New York.

(*Plate ii.*)

I HAVE tried in vain to discover, whether the subjective phenomena, which I called "Chromatokinopsias," were known in former times. Wheatstone [1] was undoubtedly the first who studied the matter, as an expert, and in a really scientific way. This author observed that all parts of a red and green carpet pattern seemed to move on illumination with gaslight, if casually glanced over. The same occurred more or less with patterns of several other colors, which he combined for that purpose, but with none so markedly as with red and green. Wheatstone explains it by saying that the eye retains its sensibility for different colors for a different length of time. Brewster,[2] studying the same phenomenon, at first observed it only in red and green, until Wheatstone demonstrated it for him in red and blue. Later on the same was reported by others, with an explanation founded upon the fact that blue appears green by yellow gaslight. The phenomenon was called "fluttering hearts" (*flatternde Herzen, cœurs dansants*), from the shape of the colored figures pasted upon a colored background (perfectly indifferent, of course, for the effect), which were originally used for experimentation.

[1] *V.* L'Institut, 1re section 1845, pag. 75. Sur un effet singulier de juxtaposition de certaines couleurs dans des circonstances particulières. (xivième session de l'associat. brit. pour l'avanc. des sciences, tenue à York en Septembre, 1844.)

[2] L'Institut, *l. c.*

In order to give an explanation of the phenomenon, Brewster calls attention to an experiment showing that any fixed object seems to move upon its background, if the intensity and position of the source of light constantly change. This experiment consists in rapidly moving a lighted candle in front of a statue in all directions. The constant change of light and shadow produces a succession of varying impressions, the seeming mobility of the statue's features lending to them the appearance of life. In the phenomenon of the fluttering hearts the mixture of red and green, which are alternatly perceived, directly or as after-images, on moving the eye, or the background, produces the impression of alternating lights and shadows, and thus that of motion. In a report on these observations, in 1847, Brücke[1] says that with Du Bois-Reymond he accidentally observed the same phenomenon under similar conditions. But he does not seem to agree with the two English physicists, adding: "No satisfactory explanation has yet been given." Taylor[2] observed the illusion only in red dots on a blue field, and *vice versa*. His explanation is similar to Brewster's. The point which seems to move, when red, appears to be edged by a shadow corresponding to the direction of motion; when blue, to be surrounded by a kind of aureola. These momentary phenomena cause differences of aspect, analogous to those we observe in a body under shifting illumination. Dove,[3] in 1853, gave an explanation of the phenomenon differing altogether from the former. Considering the imperfect achromatism of the eye, he explains it by saying that the lines of convergence of both eyes, in distinct vision, form a somewhat more acute (?) angle for red light than for blue, so that clearly defined blue surfaces appear nearer (?) than equally distant red ones.[4] He says that upon

[1] In "Die Fortschritte der Physik im Jahr 1845," 1 Jahrg., edited by G. Karsten, Berlin, 1847, page 223.

[2] *V.* the report in *Archives des sciences phys. et natur.*, vol. x. Genève, etc., 1849, p. 304. "Sur la théorie des cœurs dansants," by Mr. Henry Taylor.

[3] Dove, Dar stellung der Farbenlehre und optische Studien. Berlin, 1853.

[4] Although it is true in general that our accommodative efforts vary for different colors, in this case Dove's premises were false. It is evident, *a priori*, that we must both accommodate and converge most for the least refrangible rays (viz., the red), and *vice versa*, so that red surfaces seem nearer to us than those whose color lies more toward the violet in the spectrum. *V.* Brücke's paper:

moving the plate in its plane, the heart and the background describe tangents of equal length, the radii of the circles being unequal. The angular velocity of one appeared therefore different from the other, and both objects, image and background, seemed to overlap each other. But it is presupposed that the background is limited in extent, otherwise its movement within its plane would be perceived. Oppel[1] replies that, admitting the correctness of Dove's explanation, the phenomenon must be most marked in colors farthest apart in the solar spectrum, viz., in red and violet. He could not discover, however, that it was more marked than in yellow and blue, and it proved even more marked in intense orange on a dirty yellowish-gray background, and in pure yellow and green; *i. e.*, in adjoining colors. Therefore he thinks the main cause must be attributed to the action of subjective spectra, although "he does not question the correctness of Dove's principle." In general he adopts Brewster's and Taylor's opinion, although apparently not acquainted with it. To Helmholtz ("Physiol. Optik," p. 383), red and blue seemed most effective, and he explained the phenomena by saying that the impression of light produced in the eye by different colors does not appear and disappear with equal rapidity, and that therefore the blue appears to lag behind the red in the plane, described by the plate.

In view of these so widely differing explanations, the interest which I felt induced me to make a series of experiments myself. I performed them with 40–50 different combinations of colors; *i. e.*, I changed, not only the colors themselves, but also their shades, whereby an infinite variety of combinations was produced. By repeating each experiment several times after intervals of days and weeks,[2] I collected several hundred observations. I found colored

"Ueber asymmetrische Strahlenbrechung im menschlichen Auge," in Vienna Acad. Transactions, math.-natur. class, vol. lviii, part 2, xx. meeting.—THE AUTHOR.

[1] J. J. Oppel: "On the Phenomenon of 'Fluttering Hearts,'" in the Annual Reports of the Physical Society of Frankfort-on-the-Main, for 1853–4, p. 50.

[2] It is advisable to promptly suspend the experiments as soon as pain in the eyes and headache are felt. This often happens after a few hours, and leaves—according to my own experience—a more or less lasting irritability of the eyes. Helmholtz makes the same statement.—THE AUTHOR.

papers admirably adapted, though I used also colored glasses and bits of cloth. I cut paper rectangles 8 *cm.* long and 6 *cm.* wide, on each of which I pasted a disc 1 *cm.* in diameter, and then observed their apparent movements, using the borders of the background as objects of comparison. I preferred, for the sake of comparison, black discs of the same size, arranged at different distances from the colored ones. Sometimes I put several colored discs near the black on the same ground, for better comparison. Then two leaves of different color were arranged close to each other, so that there was only a single straight and sharp line of contact, and the one color was not, as in the first series of observations, entirely surrounded by the other.

It does not seem superfluous to state in detail some facts relating to the seeming motions. They may be noticed in the discs by moving the background, though their rate differs from that of the latter, so that they produce the impression of actual movement upon the background. They present themselves differently according to the way in which we move the background. For the sake of simplicity, I shall call these voluntary motions of the background primary, the apparent motions secondary. If the primary motion takes place exactly in the plane of the plate, no matter whether this be horizontal, vertical, or inclined, the secondary motion takes place in the same plane, and corresponds in direction with the primary, if this be in a straight, curved, or broken line. The same effect is obtained (in these motions in the plane of the plates) when the plate remains at rest and the eyes are rotated in different directions. Wheatstone first observed the phenomenon in this way. I then tried whether there would be any thing analogous in motions of the plate perpendicular to its plane. This occurred as expected, and in a more striking manner than before. By moving the plate at a suitable velocity, in a direction perpendicular to its plane, toward and away from me, I saw, according to the amount of excursion, the disc alternately floating several centimetres above or before the background, and sinking back again, sometimes, under certain circumstances, even going behind the latter. The

secondary motion changes in a corresponding manner, if the direction of the primary movement forms an angle with the plane of the plate, or if this primary movement is that of fanning or rotating, so that certain parts of the figure make larger excursions than others. The real "fluttering" of the disc is perceived by combination, conscious or unconscious, of both movements. Conical vibrations are brought about by a circular concussion of the plate, which causes, besides, an alternate elevation of the plate from its plane. Oppel likens them, quite happily, to the movements of a thick fluid in a shallow bowl, which is given a revolving motion by agitating it. In adjoining colored plates with a sharp line of separation, the secondary movements are most noticeable when the primary movement is in the plane of the plates, and at right angles, or nearly so, to the line of junction. The two colored plates seem to overlap each other alternately at the line of junction, or the line of junction seems to change its position, so that when both plates are equally broad, now the one, then the other, appears broader. These apparent movements are more difficult to be observed in movements of the plates perpendicular to their plane, but with proper illumination I have sometimes had the impression, as if I made fanning movements with the portions of one plate next to the line of junction, whenever the point of fixation was to the right or left of that line. If the primary movements are not exactly perpendicular to the plane of the plates, or if I look obliquely at them, the effect of the lateral movement is added. The illusion is, however, more striking if one color is entirely surrounded by the other.

Under certain circumstances these phenomena are even yet more marked. They are more striking under weaker illumination, than otherwise. The illumination by gaslight or other artificial means has no special influence, although Wheatstone thought it was essential, since he could not perceive the phenomena by diffuse daylight. So, too, Brewster could not see them, even by artificial light, if furnished, for instance, by a larger number of candles, or by reflection from all sides; but they became visible by daylight,

on illuminating the colored surface by a small opening in the shutters of an otherwise dark room. Oppel states also, that the effect is very slight when a candle or other source of light is used at a very short distance, whereas it increases to a certain extent with the distance, but decreases again after a certain limit is reached. I see the phenomena almost equally well in twilight or by full daylight, if I admit only a small quantity of it, or at night at a moderate distance from a kerosene-oil lamp; but quite as well close to the light, if its power of illumination is but slight, or if I diminish its brightness by a screen. Smoked colored glasses, in front of the eye, have the same effect. The phenomenon does not occur, if the obscuration is too great, so that the color-perception falls below a certain limit. It follows undoubtedly from all this, that a more or less considerable diminution of clear vision as also of color-perception favors the phenomenon. Secondly, the effect—*ceteris paribus*—is more marked to a certain degree in eccentric fixation. Different reasons are given for this by different authors. Wheatstone, for instance, thinks it must be attributed to the peculiar faculty of our retina, to perceive differences of light more in its peripheric than in its central portions. Dove thinks it probable, that the differences of angular velocity of different colors are more marked in eccentric fixation, and supports it by the observation that, by looking very obliquely to one side, in a dark room, he saw a narrow slit, brightly illuminated from outside, as a spectrum, which he could not perceive by direct fixation.

I explain the subject in a somewhat simpler manner. There may be other points involved, but the chief factor in eccentric fixation lies in the diminution of clear vision, or of color-perception, which is also a consequence of the diminution of illumination, mentioned above.

As Donders, Landolt, and others have sufficiently proven, the peripheric portions of our retina act in the same way in regard to color-perception as the central in regard to diminished illumination, and, *vice versa*, the central analogous to the peripheric in increased illumination. My observation agrees perfectly with this, that, with a certain illumina-

tion, we see the phenomenon eccentrically, but not centrally, the latter being possible only with diminished illumination. With a certain diminution of the illumination (or removal of the light to a greater distance) we do not see it by eccentric, but by central fixation. With still further diminution of the intensity of the light, the illusion disappears even with central fixation. Besides, a certain degree of brightness of the disc seemed to increase the effect. I do not intend, to enumerate all my experiments, or the color-combinations by means of which I made my observations. I shall mention but two, in which the effect shows itself in an equally high degree, and in which the phenomenon shows so clearly with proper illumination, that all doubt is excluded. One combination is light grass-green upon carmine iii. as background (according to Jung's Heidelberg color-book, *vid.*, fig. 1, plate ii.); the other is light neutral gray, upon orange iv. as background (according to the same system, *vid.*, fig 2, plate ii.). This latter combination is very effective in producing the illusion, but is not even mentioned by the authors referred to; it is far superior to the red-blue combination, which, rather strangely, Taylor states to be the only one capable of showing the phenomenon.[1] A reversal of the arrangement of the colors has not an equal but still a sufficient effect.

Both combinations above mentioned show the phenomenon best when two centimetres distant from a common kerosene-oil lamp provided with a shade of milk-glass. For instance, looking at fig. 1, plate ii., I see the grayish-green after-image of the disc very clearly defined, exactly at the same place where, on starting, the green disc had been, if I move the plate with a proper velocity, easily found in a few experiments, from left to right and then ceasing, avoiding all sudden movements; an excursion of 1–2 *cm.* is sufficient. With a certain velocity, and with a certain amount of motion, I see the disc and its after-images close to each other upon the background for a moment, sometimes separated from each other by a portion of red ground. This lasts only a moment; then the after-image moves toward the disc

[1] The gray letters on some of Pflueger's plates with red ground show the phenomena very plainly.—The Author.

and unites with it. The same occurs at the opposite side, if I move the plate to the left—viz., I see the after-image at the former place of the disc, *i. e.*, to the right of the latter; then it quickly moves to the left and joins the disc again. The after-image follows always in the direction of the voluntary movement of the plate. If this voluntary movement of the plate is repeated several times in both directions, the after-image does the same. The after-image is most marked at the point where the movement is reversed, since the object remains there longest. It is much less marked and indistinct along its line of motion. If the movements of the plate from side to side are very rapid, the after-image does not seem to end its movement on its coalescence with the disc, but to go beyond it, as it is there when the plate is rapidly drawn back; but we are unable to determine whether this withdrawal is an earlier act on account of the rapidity of its motion. The sudden appearance of the after-image at the other side of the disc gives rise to the impression that it had continued its movement beyond the latter. Since we mistake the after-image for the disc itself, the latter seems to make greater excursions in every direction than the plate really does; therefore it seems to shift toward the margin of the plate, or toward another object (black disc [1]), situated to one or the other side of it. The phenomena are of course analogous when the movements take place in other directions than in the plane of the plate.

What is the nature of the after-image? As mentioned above, it appears grayish-green if it is entirely upon the red background, but even if it is partly upon the red background and partly upon the disc, the latter portion appears grayish-green, with a somewhat darker hue than the portion upon the red background. The remaining portion of the disc appears red, mixed with gray, which easily escapes our attention, especially under diminished illumination, since we devote our whole attention to the apparent movements of the predominating after-image. I explain it as follows: The after-image is a positive one, such as every object moving at a certain rate of speed produces. Originally it has the same

[1] In the examples mentioned, a black object may be used for control, but even black shows apparent movements upon ultramarine blue.—THE AUTHOR.

color as the green disc, but changes to grayish-green, due to the influence of the inducing color, the red of the background (in a more general sense). This effect is of course more marked in the portions of the after-image falling upon the red background itself as the result of the movements. For the same reason the disc itself—that is, the portion not covered by the after-image—appears red, mixed with gray. A certain intensity of illumination is necessary for every special case, in order to recognize these differences of color. This is impossible with less than a certain definite amount of illumination—for instance, in rather advanced twilight; the whole background then retains a quite uniform color, but the movement of the disc is equally noticeable. Under an appropriate illumination by a kerosene-oil lamp, no trace of these differences of color can be detected (fig. 2, plate ii.), but the phenomenon is mostly well marked. Therefore, some authors are wrong in thinking the phenomenon dependent upon these differences of color, which are irrelevant. I cannot discuss here all possible cases of color combinations, so I have only presented two of the most typical.

I shall be brief with regard to movements perpendicular to the plane of the plate, since the same changes take place, only modified by the conditions. If, fixing the plate, I rapidly bring it nearer, the size of the retinal image increases. That of the after-image is dependent upon the size of the retinal image[1]—the point of fixation (convergence) remaining the same—*ceteris paribus*. If I remove the plate quickly, the larger after-image seems to remain for a moment in the position formerly occupied by the disc; it soon becomes smaller, and, apparently passing through the intervening space, unites with the object itself. The excursions of the after-image and of the disc itself seem to be greater than those of the plate, since the moment can not be precisely determined when the direction of the movement is reversed. The explanation is the same as that given above; in the same way the various combinations of movements within the plane of the plate with those out-

[1] The reason why these apparent movements occur quite as well in monocular as in binocular vision is that we converge correctly, even if we close one eye.—The Author.

side of it, or of adjacent colored surfaces, will be easily understood, *mutatis mutandis*. As long as we have no exact explanation of the phenomena of after-images we are only able to describe the facts, in answer to the question: What in general should be the combinations of colors in order to best exhibit the phenomena? Aubert considers even the expressions "continued excitation" and "fatigue" a "sometimes convenient circumscription of the facts," the circumscribed facts not being explained. It would be undoubtedly of great interest to investigate how individuals, with a congenital or acquired diminution of color-perception or complete color-blindness, would perceive these phenomena. The "chromatokinopsias" might be made use of as a very simple means of diagnosis, if definite facts should be established. I shall endeavor to make such experiments at a proper time and report upon them.

A CASE OF MICROCEPHALUS WITH MICROPHTHALMUS.

By Dr. E. PFLUEGER,

PROFESSOR OF OPHTHALMOLOGY AT THE UNIVERSITY OF BERNE, SWITZERLAND.

(*With plate i.*)

Translated by Dr. A. SCHAPRINGER, New York.

THE case detailed here is that of Emma Blaser, aged eleven, of Luetzelflueh, Switzerland, who was an inmate of our clinic from November 23 until December 4, 1882. She was seen again in June, 1883, and exhibited to the Medico-Pharmaceutical Society of Berne. The microcephalus was well marked, though only one of a medium degree, and of the variety called trigonocephalus.

The measurements of the skull were made by Professor Flesch, who has had considerable experience in this kind of work, and who was assisted by Dr. Freund. The method employed was that of Virchow and Rieger.

I am indebted to Professor Flesch for the outlines of the head, reproduced in plate i., and for the following data.

" Hair blonde, eyes brown, the same as her mother. Length of body, 133 *cm.;* height to hip, 78.9 *cm.;* length of arm, 57 *cm.* Measurements of skull: greatest length, 158 *mm.;* greatest breadth, 130 *mm.;* horizontal circumference around occipital protuberance and eyebrows, 476 *mm.;* circumference from glabella to occipital protuberance, 290 *mm.;* from glabella to lowest point of occiput between muscles of neck, 328 *mm.;* frontal circumference, above external auditory canals, 299 *mm.;* breadth of skull between zygomatic arches, 100 *mm.;* between openings of audi-

tory canals, 136 *mm.*; height of face, 109 *mm.*; of nose, 59 *mm.*; breadth of face between rami of lower jaw, 86 *mm.*; length of right half of lower jaw, 73 *mm.*; of left, 71 *mm.*

"The two lateral halves of the skull are asymmetrical, the left being less developed anteriorly, the right less developed posteriorly. The line of circumference shows a marked indentation in the temporal region of the right side, and consequently the greatest breadth is found far back. The most striking feature of the head is the narrowness of its frontal portion, which constitutes it a trigonocephalus. The general measurements of the head are not excessively small, except those of the frontal segment, the diminutive proportions of which make it evident that there must be a deficient development of the brain."

The microphthalmus, like the microcephalus, while not of high degree, was well marked and unmistakable. The corneæ were not circular, but transversely elliptical, the vertical diameter of each being 9 *mm.*, the horizontal 10 *mm.*

There were two symptoms present which rendered the examination of the eyes difficult and incomplete—very violent horizontal nystagmus and complete absence of central fixation. The little girl habitually held her head inclined to the left, often to such an extent that the bridge of her nose was parallel with the line of her shoulder, her eyes being rolled to the extreme right, and at the same time considerably either above or below the horizontal meridian.

The acuteness of vision could not be determined in either eye, owing partly to the great imperfection of the visual power, and partly to the deficient development of her intellect. It was evident, however, that she used only her right eye for fixation, fixing not with the macula lutea of this eye, but with a portion of the retina, situated a considerable distance to the outer side of the macula, and either above or below the horizontal meridian. The refraction of the right eye, as determined by keratoscopy, proved to be slightly myopic (1 or 2 D.).

Both corneæ were perfectly transparent. The iris of either eye was normal in every respect, except as to size. There was no coloboma, the pupils being normal in shape, size, and position. Atropia caused only incomplete dilatation of the pupils.

The lens of the right eye was completely transparent. That of the left showed partial posterior cortical cataract, which will be described further on, and on account of which I performed a

small pear-shaped iridectomy on the nasal side. Although the optical conditions of the eye were greatly improved by this operation, her visual power did not seem to increase.

In the background of both eyes were numerous irregular yellowish-white atrophic patches, varying in size from a mere dot to that of the optic disc, apparently the sequelæ of intra-uterine retino-chorioiditis. There were also numerous oblong collections of dark pigment, the length of some being equal to five or six times the diameter of the disc. The most remarkable feature, however, were large greenish-blue spaces of oblong form, showing a reflex like that of mother-of-pearl.

In both eyes there was a coloboma of the sheath of the optic nerve and of the choroid on the temporal side of the optic disc. In the right eye the shape of the disc was a transverse oval. It was well defined by the scleral ring above, below, and on the nasal side. On the temporal side the vaginal ring was absent, and its place was taken by translucent nerve-substance. Here the boundary line of the disc was less distinct than normal, and showed indentation which made the disc appear slightly heart-shaped.

The choroid receded from the lower periphery of the disc, less on the nasal than on the temporal side ; hence the appearance of a spherical triangle with an acute angle at the nasal portion of the disc. Passing from the nasal to the temporal side of the disc, the distance of its periphery from the choroidal margin increased, and the choroid, instead of rising on the temporal side in correspondence to the outline of the disc, kept its direction outward and downward, being sharply defined for some distance only. At the upper periphery of the optic disc the choroidal border receded from the disc, as below, continuing directly outward and upward across the fundus, instead of lining the temporal border of the papilla. The two sides of the choroidal coloboma formed an angle of 50° to 60°, which was bisected by the horizontal meridian of theglobe.

The coloboma did not show the bright yellowish-white color of the bare sclera throughout, but only in areas which were divided by accumulations of pigment distributed with a certain degree of regularity. The pigment lay in vertical streaks slightly curved, the convexity of the curves looking toward the temple. This regularity was most striking in the immediate vicinity of the disc, so that the lower crescent appeared to be composed of a number

of alternately black and yellow vertical arches. This regularity was less marked, however, on the temporal side.

At a distance of from 6–7 P. D., and situated at its outer side, there was a curved oblong band running vertically, its length equal to 6–8 P. D., and its breadth to about 1 P. D., which showed a brilliant greenish-blue reflex. On the outer side of this band ran a streak of very black pigment, having at its broadest portion a breadth equal to ½ P. D. On the outer side of this streak the choroid showed the same appearance as in the rest of the background, being studded with choroidal exudations, atrophic patches, and numerous accumulations of pigment.

The arrangement of the retinal vessels was strikingly abnormal. The main vessels did not run upward and downward, but they all ran outward and formed an angle of 45° to 50°. One small vessel ran upward and inward upon the papilla, and another small one downward and inward. Upon reaching the border of the disc both suddenly turned and took an outward course, only to change it again after running a short distance by returning to the disc and traversing it from without inward. The two vessels then crossed each other, presenting the appearance of a bow-knot.

The fundus of the left eye presented changes more pronounced and similar, with the following exceptions: There was also a coloboma of the sheath of the optic nerve and of the choroid. The sides of the choroidal coloboma, however, did not diverge, but ran parallel to each other. They could not be traced further than the equator, on account of the cortical opacity of the lens. The optic disc was not quite so small, but it was more elliptical, its vertical diameter being somewhat smaller than that of the right disc. The color of the coloboma was darker, with an occasional greenish shimmer, and extensive and irregular accumulations of pigment. The portions of the choroid immediately adjoining the coloboma showed little change, but toward the periphery it had undergone extensive changes. Here, as well as in the other eye, the atrophic patches were greatly outnumbered by the proliferations of pigment. There was also an extensive area of a greenish-blue color, resembling the tapetum of animals. Unfortunately, it was not possible to thoroughly study all the details.

The retinal vessels were parallel and ran directly outward, following the direction of the sides of the choroidal coloboma. There were no retinal vessels running in any other direction.

The calibre of the retinal vessels seemed to be smaller than

normal, more markedly so in the left eye than in the right. The arteries and veins could not be distinguished from each other.

The color and translucency of the right optic disc was about normal, but the left was as opaque as in cases of advanced retino-choroidal atrophy.

The opacity of the left lens mentioned above was situated mainly in the posterior cortical substance. It began at the posterior pole, and was of such shape and size that it just obstructed the pupillary area when looked at from in front, before the iridectomy was performed. From the posterior pole the opacity extended outward as far as the equator, forming an isosceles triangle with the base at the equator. The rounded angle at the posterior pole was about 40°. The opacity did not cease at the equator, but extended for the distance of 1.5 to 2 *mm.* into the anterior cortical layer. There was evidently a causal relation between this opacity of the lens and the choroidal coloboma, as evidenced by the correspondence of their location.

It does not seem to be difficult to find an explanation for this anomaly of development. Manz, noticing the frequent coincidence of coloboma of the uvea and microphthalmus, suggested that microphthalmus might be caused by intra-uterine chorioiditis. This supposition was confirmed by Deutschmann,[1] who had the opportunity of making an autopsy of such a case. The present one also tends to corroborate the hypothesis of Manz.

In his review of Deutschmann's paper in *Nagel's Jahresbericht* Manz says: "The supposition appears to be very plausible that intra-uterine sclero-chorio-retinitis will cause incomplete closure of the fœtal fissure, or will cause it to re-open if already closed. This hypothesis will certainly be generally accepted if corroborated by the anatomical examination of a few more cases of coloboma bulbi. One thing, however, still remains unexplained, namely the fact that the inflammatory changes are confined to the neighborhood of the ocular fissure."

Our case evidently serves to fill a gap here, as in it the choroidal changes, though most striking in the neighborhood of the coloboma, were well marked throughout the whole fundus.

---

[1] *Zehender's klin. Monatsbl.*, Bd. xix., p. 112.

The course of the retinal vessels was very peculiar and such as I had never before observed in the human being. It can be explained by assuming that the cicatricial contraction of the choroidal coloboma caused traction upon the retina, dragging its upper portion downward and the lower upward. The indentation of the outer periphery of the right optic disc can also be explained by the cicatricial contraction of the sides of the coloboma. This theory seems to be corroborated by the concentric arrangement of the pigment deposits in the fundus of the right eye. The elliptic form of the cornea was another feature for which the theory of cicatricial contraction affords a natural explanation. In our case, where the direction of this contraction was vertical, the greater diameter of the cornea was horizontal, whilst in the case published by Deutschmann, in which the direction of the coloboma was downward, the lesser axis of the cornea was horizontal.

The outward direction of the coloboma in this case was unusual, the coloboma being usually directed downwards. This unusual feature can be explained by the hypothesis that the fœtal cleft is first directed outward, and that a gradual rotation of the globe changes this direction downwards, and that in the present case the globe for some reason or other had not performed this rotation.

Frau A. Blaser, æt. forty-four, the girl's mother, showed an abnormal condition of the skull as well as of the eye similar to that exhibited by her daughter only somewhat less marked. The greatest horizontal circumference of the skull was 530 *mm.*, the left half being larger by 5 *mm.* than the right. Circumference around glabella and occipital protuberance 284 *mm.*, over gabella and muscles of the neck 310 *mm.*, arch over auditory orifices 360 *mm.*, length about 170 *mm.*, breadth about 137 *mm.*

Both corneæ were somewhat smaller than normal and slightly elliptical, the vertical diameter being 10 *mm.*, the horizontal 11 *mm.* No coloboma. Choroidal ring at outer periphery of optic disc very dark.

Frau Blaser has another daughter who is said to have perfectly normal eyes. She has had a third child, which died, two hours after birth, from hydrocephalus.

Frau St., æt. thirty-five, a sister of Frau Blaser, has a normal skull, but a slight microphthalmus, the diameter of either cornea being only 10 *mm.*

O. s. M. 0. 75 and As. m. 0.5, axis vertical, V̄ = 0.5
O. d. M. 1 and As. m. 0.5, axis vertical, V = 0.75

Ophthalmoscopic appearances normal.

Frau Blaser's father is also said to have abnormal eyes, but he could not be prevailed upon to present himself for examination.

Explanation of Plate No I.

Projection of shape of head according to Rieger and Virchow (Sitzungsber. d. phys.-med. Ges. in Würzburg, 1882, p. 96).

————Sagittal Arch (Glabella and Occipital Protuberance).

— — — — Frontal Arches :

1. Breadth at auditory orifices.
2. Arch between auditory orifice and glabella.
3. Occipital arch, between auditory orifice and occipital protuberance.

These three arches stand vertically upon the horizontal plane.

—·—·—·—Horizontal Planes :

4. Through occipital protuberance and glabella.
5. A parallel plane two *cm.* higher than the preceding.

REPORT OF CASES FROM PRACTICE.

By Prof. Dr. C. SCHWEIGGER.

Translated by J. H. Shorter, M.D., New York.

I.—*Cases of commotion of the optic nerve.*

Case I.—Thodore E., eight years old, was brought to me on Oct. 9, 1882, on account of blindness of left eye. Externally there was nothing to be remarked, and ophthalmoscopic examination found all appearances entirely normal. The iris of the left eye moved freely in the accustomed way in conjunction with that of the right; but with the right eye closed the pupil of the left remained wide and fixed. Not the slightest reaction to light was present, and even the most concentrated light from a gas flame by a strong convex glass was not perceived.

On the 6th of October the boy, when playing, fell and struck with his face on the blunt end of an iron tool which he held in his hand at the time. In the region of the upper jaw, just opposite the first left molar tooth, there was a superficial cutaneous wound, which did not penetrate to the cavity of the mouth, and at time of the examination was almost entirely healed. The blindness was perceived immediately after the injury. No cerebral manifestations had appeared.

As complete blindness following this had already lasted for three days, I regarded the prognosis as extremely unfavorable, and recommended leaving the matter to take its course. The patient followed this advice.

The blindness remained for several days unchanged, then perception of light appeared, and at the next examination, on October 20th, the acuity of vision was at one metre ½; at five metres No. 24 was recognized. The eccentric vision seemed somewhat indis-

tinct, only outwards and downwards. The pupillary reaction and ophthalmoscopic appearances were normal.

It is naturally much to be lamented that injection of strychnine was not once tried. This flower of therapeutics would now be richer by one more so-called clearly demonstrated case. When will it ever become customary in therapeutics to reason in a scientific manner?

But one thing should certainly be clear—namely, that we can speak assuredly of therapeutic results only in so far as we are entirely sure of the prognosis. Only when we know what may happen without our therapeutics, can we judge what we really accomplish by them. Fortunately a great many things improve without our interference.

I had not dared to hope that an absolute blindness with abolished perception of light could heal with restoration of useful vision after lasting for three days. My prognosis was incorrect, but in this case therapeutics would have accomplished nothing except to add a second error to the first one.

The further course brought still another surprise. On December 2, 1882, the acuity of vision was as before $\frac{5}{24}$. No. 0.6 was read fluently, fingers could be counted eccentrically in all directions, colors were correctly recognized, but the optic nerve was considerably paler than that of the right eye. At the last examination, on February 3, 1883, the conditions were unchanged.

CASE 2.—Previously I had opportunity of seeing a similar case. Marie K., of Prenzlau, twenty-three years old (according to statements in a letter from her family physician), in bending suddenly forward struck her face against an upright, sharp-edged stick, the kitchen where she was occupied being somewhat dark.

The immediate consequence was a free bleeding from a severely painful wound in neighborhood of the right lower orbital edge. The eye itself was not injured, but instantly blinded, so that light and darkness were not once distinguishable. It was also learned from the physician's letter that there had been no intra-ocular hemorrhage.

The wound healed rapidly, vision improved slowly, and on January 26, 1878, when I first saw the patient, she had $\frac{5}{60}$ and with $+\frac{1}{10}$ could read 0.75 with difficulty. The field of vision was especially contracted from above. The lower part of the optic nerve, upright image, seemed quite bleached, the central excavation somewhat greater than in the left eye. On February 19, 1878, V had still somewhat improved to $\frac{5}{36}$.

CASE 3.—A third case befell a colleague who, in leaping his horse, suffered a contusion of the head, followed immediately, so stated, by complete blindness. Three months later I found in the right eye myopia $\frac{1}{8}$, V = $\frac{6}{24}$ (sight was said to have been perfect previously), the field of vision complete, the optic nerve somewhat pale on the temporal side. Left eye: myopia $\frac{1}{8}$, V = $\frac{6}{9 \text{ to } 6}$. In both eyes only slight posterior staphyloma.

That there was no injury to the optic nerve in the first two cases is obvious.

In the third case a fracture of the bone of the skull in the neighborhood of the optic foramen might be thought of, although the patient, who is at the same time a competent judge, denied the possibility of such a thing. So there remains only the contusion of the cranial bones to account for the blindness. At all events the etiological connection between the injury and the transient blindness is undoubted, and the causation of the blindness can only be looked for in the optic nerve. But it is only at one place that the latter could be reached or affected by the jarring of the cranial bones—that is, in the optic foramen. In the orbital tissues the optic nerve is too softly embedded to be accessible to indirect contusion, and farther back on the base of the skull the chiasma would have been implicated, causing interference with sight in both eyes.

In regard to the changes which took place in the optic nerve as immediate results of the commotion, only theories can be adduced; the most probable is naturally the presumption of a hemorrhage.

At all events the results of the commotion in the optic nerve were sufficiently important to effect an immediate interruption to conduction; on the other hand, transient enough to admit of the restoration of a slightly impaired power of vision; and finally, of so material a nature as to leave a permanent paleness.

II.—*A rare conjunctival lesion.* (*Formation of vesicles with subsequent atrophy.*)

The patient, a vigorous man of seventy, who up to that time

had never suffered with his eyes, was affected in the summer of 1882 with an inflammation in both.

When I saw him in November I found the scleral conjunctiva strongly and irregularly congested, penetrated by large blood-vessels, the conjunctiva of the lower lid shrunken and adherent to the ocular conjunctiva. On the upper lid every thing was normal.

The previous short duration of the disease, the normal condition of the upper lid, and the irregularity of the shrinkage on the lower, which only at isolated circumscribed spots had caused attachment of the border of the lid to the scleral conjunctiva, were all opposed to a trachomatous atrophy. The painfulness was unimportant while the persistent, striking redness of the eyes was disagreeable to the patient.

In February, 1883, I was called suddenly on account of an important aggravation of symptoms which had set in during the night. When I arrived the patient was at breakfast reading his paper and knew nothing about it, but the attendants had noticed that something had happened in the right eye. There appeared, in fact, on the scleral conjunctiva, close to the edge of the lower lid, a deeply congested place and a light gray movable mass, evidently a part of the wall of a vesicle which was hidden in great part behind the under lid and had already burst, just as I had seen it in cases of pemphigus conjunctivæ in association with the same disease in the skin. The pemphigus vesicles had never been present in the skin, but on the other hand the patient had suffered for years with a similar disease of the mucous membrane of the mouth, on which circumscribed patches of inflammation appeared from time to time.

At the spot where the formation of the vesicle had taken place a new attachment of the edge of the lid to the ball gradually developed.

This large inflammatory vesicle had naturally not the slightest resemblance in its formation to the small translucent vesicles which are occasionally seen on the scleral conjunctiva.

Throughout, nothing of a therapeutic nature was employed; the patient had on this account the very natural desire to have the advice of others, and went to Prof. Graefe in Halle. Prof. Graefe stated to me that he regarded the case as belonging to a group which he had reported as cases of "Essential Atrophy of the Conjunctiva."

In the foregoing case, according to my view, the atrophic

process was set up as the result of the vesicle formation observed in the conjunctiva; and I am under the impression that such may have been the condition also in other cases, as it was only by accident that I had the opportunity of seeing the remains of a vesicle which in any case remains only a very short time, makes very little pain, and therefore is hardly noticed by the patient.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FIRST QUARTER OF THE YEAR 1884.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE CO-OPERATION OF

C. E. Fitzgerald and Ferguson, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

1. Armaignac. Projet de création d'un musée ophthalmol. *Rev. clin. d'ocul.*, 1884, No. 3.

2. Berger and Auracher. Practica Oculorum of Benvenutus Grapheus. Contribution to the history of ophthalmology. Munich, 1884.

3. Bravais. Simulation of one-sided amaurosis. *Soc. franç. d'ophth.*, Jan. 31, 1884. *Centralbl. f. pract. Augenheilk.*, 1884, p. 113.

4. Schäfer. The eyes of the pupils of the deaf and dumb asylum at Gerlachsheim. *Centralbl. f. pract. Augenheilk.*, March, 1884.

5. TEPLJASCHIN. Ophthalmological observations. ***Medizynski Wjestnik***, No. 8–11.

6. UHTHOFF. Ophthalmoscopic examinations in nervous diseases. *Report on the XV. meeting of the Ophthalmological Society*, Heidelberg, 1883. Rostock. 1883, p. 139.

ARMAIGNAC (1) favors the proposition of Louis Roy, to erect an ophthalmological museum, which shall contain prepared specimens, with descriptions furnished by the donors, in its physiological, pathological, anatomical, comparative anatomical, and teratological departments. Armaignac would like to combine with it an ophthalmological library and collection of instruments, made as complete as possible and obtained by donations, and would like to see it undertaken by the French Ophthalmological Society. V. MITTELSTÄDT.

BERGER and AURACHER (2) have edited the rare Practica Oculorum of Benvenutus Grapheus, who lived before the fifteenth century. The chapter of cataracts is treated at greater length. He includes under them opacities of the lens, amblyopia, and amaurosis, and accordingly distinguishes between curable and incurable cataracts. The operation is always preceded by a course of preparatory treatment. Reclination is discussed at length, as well as the bandaging and after-treatment. The therapeutical part is very voluminous and contains an immense number of prescriptions, salves, etc.

BRAVAIS (3) puts a red glass before the one eye and a blue glass before the other, and tells the individual to read type, half of which is blue and half red. If he is a malingerer, he will read fluently, as he can recognize the red letters through the blue glass, and the blue letters through both. But if he is blind in one eye, for instance on the one covered with the blue glass, he will be unable to read the blue type through the red glass with the seeing eye. But if the blue glass be then brought before the good eye, he will be able to read all.

SCHÄFER (4) found marked preponderance of emmetropia and hypermetropia. The anomalies of refraction were only of a low degree. Neither the number of myopes nor the degree of myopia increased with advancing age. Simple astigmatism occurred in five pupils among the ninety-five—hypermetropic in four, and myopic in one. V was normal in eighty cases. Accommodation was normal in ninety-four cases, the action of the other muscles also. In 5 % there was retinitis pigmentosa.

TEPLJASCHIN (5) treated 2,130 eye-patients from 1879 to 1881 in Uni, district of Glasow, department of Wjatka; they constituted 13.3 % of all patients. Anomalies of refraction and accommodation were rarely observed. Trachoma, with its results, was of very frequent occurrence, especially among the Wotjaks (according to the author 25 % of the whole Wotjak population suffers from trachoma). The cornea was affected in 52.8 %, the conjunctiva in 35.7 %, the lids in 18.9 %; cataract occurred in almost 3 % of all cases, glaucoma in 2 %. HIRSCHMANN.

UHTHOFF (6) examined 542 cases of mental affections; 170 were cases of psychosis, 150 of progressive paralysis of the insane, 135 of alcoholism and the mental disturbances depending upon it, fifty-six of epilepsy, and thirty-one of actual localized affections of the brain and spinal cord. The result was as follows:

Among the thirty-one cases of localized affections the ophthalmoscope revealed changes in the fundus in twenty cases, 64 %:

(*a*) Abnormal haziness of the retina or papilla, or slight neuritis, in eight cases, 22½ %.

(*b*) Choked disc in three cases, 9⅝ %.

(*c*) Abnormal paleness or atrophy of the papilla in three cases, 9⅝ %.

(*d*) Marked hyperæmia of the papilla in one case, 3¼ %.

(*e*) Retinal hemorrhages in two cases, 6⅝ %.

(*f*) Hemianopsia in two cases, 6⅝ %.

(*g*) Conjugate deviation in one case, 3¼ %.

Among the 150 cases of progressive paralysis of the insane there were ophthalmoscopic changes in seventy-five, *i. e.* 50 %. There is generally an even, more or less intense haziness of the retina, which also affects the papilla and extends far into the retina; these changes were observed in thirty-two cases, or 28 %. Sometimes, in about 8 %, there is also marked hyperæmia of the papilla. Uhthoff seeks the cause of the haziness in the layer of nerve fibres, and proposes the name of retinitis nubescens or smoky retinitis for it; Klein called it paralytic retinitis.

Atrophy of the optic nerve comes next in frequency in progressive paralysis, namely, in thirteen cases, 8⅝ %; counting doubtful cases, in which there was discoloration of the papilla, but atrophy was uncertain, the percentage rises to 14.

Slight forms of genuine neuritis optica were but rarely observed. Choked disc did not occur at all. Marked hyperæmia of the optic disc without any opacity was found in only three cases among the 150 of progressive paralysis; retinal hemorrhage only once.

Ophthalmoscopic changes were found in fifty-five cases among the 135 of alcoholism, *i. e.* in 41 %. The most frequent is a uniform gray opacity of the retina and disc, which does not produce any marked visual disturbances. Next in frequency comes partial atrophic discoloration of the disc, which is confined to the temporal half and occurs in about 15 %. Uhthoff thinks this condition may be of service in assisting to make the diagnosis of alcoholism. In five cases there was hyperæmia of the papilla, and in two neuritic changes were observed in the disc.

Ophthalmoscopic changes were observed in seven cases, 12 ½ %, among the fifty-six of epilepsy:

Slight neuritis optica in two cases, 3½ %.

Abnormal pallor of the papilla in two cases, 3½ %.

Hyperæmia of the papilla in one case, 2 %.

Slight haziness of the retina and papilla in two cases, 3½ %.

Ophthalmoscopic changes were observed in seventeen cases, 10 %, among the 170 of psychosis:

Slight diffuse haziness of the retina and papilla in eleven cases, 6½ %.

Abnormal pallor of the discs in three cases, 1½ %.

Hyperæmia of the discs in two cases, $1\frac{1}{10}$ %.

Retinal hemorrhages in one case, ½ %.

b—STATISTICAL PAPERS.

7. BÄUERLEIN. Würzburg Ophthalmic Clinic. Report, for fifteen years (1869–1883), with a paper on 400 cataract-operations. Würzburg, 1884.

8. BERGMEISTER. Report of the School for the Blind at Purkersdorf, Lower Austria. Second report; the school was formerly at Ober-Döbling. Vienna, 1884.

9. MANCHESTER ROYAL EYE HOSPITAL. Sixty-eighth Annual Report, 1883. Manchester, 1884.

10. MASSACHUSETTS. Fifty-eighth Annual Report of the Massachusetts Charitable Eye and Ear Infirmary, for the year 1883. Boston, 1884.

11. VAN MILLINGEN. Report of the Private Ophthalmic Institute at Constantinople, for the year 1882. Salzburg, 1883.

12. NEW YORK. Fourteenth Annual Report of the New York Ophthalmic and Aural Institute, for the year 1883.

13. SCHREIBER. Annual Report of the Magdeburg Ophthal-

mic Institute, from Oct. 1, 1882, to Dec. 31, 1883. Magdeburg, 1884.

Bäuerlein (7) has treated 20,518 patients, and performed 1,308 operations; among these, 423 extractions according to v. Graefe. In 90.5 % the course of the operation was perfectly regular; in 9.5 % unpleasant accidents occurred, namely in twenty-five cases, prolapse of vitreous—in eight before, and seventeen after, the expulsion of the lens, profuse hemorrhage in eleven cases, and in two the corneal section was too small. The course of healing was normal in 76.5 %, in 24.5 % not normal—being complicated, in forty-five cases, with iritis; in six, with iritis resulting in closure of the pupil; in three, with iridochoroiditis; in two, with purulent iritis; in ten, with secondary hemorrhage; in five, with infiltration of the edge of the wound; in two, with panophthalmitis; in twenty-one, with impaction of iris in the wound. All in all, eighteen eyes were lost. The results of the antiseptic operations were poorer than of the operations without antiseptics.

Bäuerlein has also endeavored to arrange and utilize his cases, both in regard to the etiology of eye diseases and the statistics of blindness.

In Manchester (9) 16,502 patients were treated, and 1,365 operations performed—165 extractions according to v. Graefe; good results in 137 cases, moderate results in eleven; operation successful in four cases, but V poor, on account of other previous diseases; thirteen operated eyes were lost—eight through suppuration of the cornea, five through suppuration of the iris. Ophthalmia neonatorum was observed in 358 cases; in forty only one, and in eighteen both corneæ were affected.

In Boston (10) 7,468 new patients were treated—seventy extractions according to v. Graefe, six of them losses, in two only quantitative perception of light. Of twenty-four cases treated with jequirity, fourteen were improved, six remained as before, four were partially improved. Of the twenty-four treated with jequirity, twenty-two had pannus; in four the pannus had increased in spite of the treatment; in eight it had completely disappeared; in seven, almost; in two, no change; in one it became less dense

Millingen (11) instils a four-per-cent. solution of boracic acid into the conjunctival sac before the extraction; the face, lens, and lashes are first cleansed with soap and water, and then with

carbolic acid. Every patient is given a Turkish bath a day before the operation. The instruments are disinfected with boiling water. Bandage of carbolized cotton. Of fifteen extractions of senile cataract, not one was lost. Corneal ulcers are treated with the ferrum candens (every other day) and iodoform.

SCHREIBER (13) treated 1,364 patients, and performed 122 operations. The lachrymal sac was extirpated in five cases; in four of them on account of ectasia of the sac and blennorrhœa of long standing, and once on account of phlegmone of the lachrymal region with fistula. Schreiber praises the results of extirpation highly.

In the dispensary of the NEW YORK OPHTHALMIC AND AURAL INSTITUTE (12), 5,638 new eye-patients; in the hospital, 340. Operations, 524; extractions of cataract, sixty-three (one failure); division, fourteen cases; divisions of secondary cataract, fifty-one (no failure). Iridectomies, seventy-seven; enucleations, sixty; squint operations, 111. The Institution is raising a permanent fund, with a view to make it independent of the financial aid of its founder and present surgeon-in-charge—Dr. H. Knapp.

BURNETT.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

BY H. MAGNUS, M.D.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

14. BECHTEREW. On the phenomena observed after dividing the fibres of the optic nerve within the cerebral lobes in the neighborhood of the posterior portion of the inner capsule. *Neurol. Centralbl.*, 1884, No. 1.

15. FÖRSTER. The diagrams for entering the extent of the field of vision. *Report on the Fifteenth Meeting of the Ophthalmological Society*, Heidelberg, 1883. Rostock, 1883.

16. ORTMANN. Experimental investigations on central keratitis. *Inaug. Diss.*, Königsberg, 1884.

BECHTEREW (14) produced, by his divisions, homonymous hemianopsia on the side opposite the injured hemisphere. The boundary between the defect in the visual field and the intact portion is a line passing close to the point of fixation. The pupils were not affected. Bechterew concludes from his experiments

that the fibres of the optic nerve, after reaching the corpora quadrigemina on one side, pass on through the posterior portion of the inner capsule of the hemisphere of the same side without crossing again.

FÖRSTER (15) would like to have a uniform chart for entering the extent of the visual field adopted. The point of fixation should lie at the point of intersection of the meridians. The parallels should be equidistant, but their distance apart should not be measured by the difference between the length of the sines. Some agreement should also be come to in regard to the numbering of the meridians, and the boundaries of the normal field of vision. Förster makes some propositions with this object in view.

ORTMANN (16) has found that the difference in reaction of the corneal tissue after impregnation with bacteria depends upon the conjunctival secretion. This alone, not the fixed cells, takes part in producing the infiltration surrounding the punctures. Infection of a corneal wound is generally followed by an inflammatory process in form of an infiltration, a genuine pus nodule, which afterward breaks down, beginning at the centre, and forms an ulcer. Heterogeneous elements, coming from the conjunctiva, and not proliferating cells of the corneal tissue, take an active part in this process ; they are white blood corpuscles, which have passed through the blood-vessels of the conjunctiva, especially at the limbus.

b.—THERAPEUTICS.

17. CARTER, BRUDENELL. Modern operations for cataract. Lect. I., II., III. *Med. Times and Gazette*, 1750, 1752, 1754.

18. DUBOIS. The effect of a prolonged chloroform narcosis on the eye. *Soc. de Biol.*, Jan. 19. *Le Progrès Méd.*, 1884.

19. GAYET. Iridectomy with an empty anterior chamber. *Soc. franç. d'ophth.*, Jan. 28, 1884. *Centralbl. f. pract. Augenheilk.*, 1884, p. 49.

20. KAZAUROW. The effect of hot full-baths and foot-baths on the circulation of blood in the eye and on the intra-ocular pressure. *Wratsch*, 1884, Nos. 1 and 2.

21. NORTON, G. S. The use of ice in ophthalmic cases. *Amer. Homœo. Ophth. and Otol. Soc.*, 1883.

22. PAMARD. Sur un nouveau procédé d'iridectomie. *Soc. franç. d'ophth.*, Jan. 31, 1884.

23. PFLÜGER. General therapeutics. *Report of the Berne University Ophthalmic Clinic for the Year 1882.* Berne, 1884.

24. SATTLER. Antiseptics in ophthalmology, especially sublimate, and the use of cauterization. *Report on the Fifteenth Meeting of the Ophth. Soc.*, Heidelberg, 1883. Rostock, 1883.

DUBOIS (18) has found that in prolonged chloroform narcosis the ophthalmoscopic image becomes indistinct on account of the development of irregular corneal astigmatism. After the disappearance of the pupillary reflex the refraction is diminished 4–5 D., while T is also reduced.

KAZAUROW (20) observed in thirty cases the effect of hot full-baths (fifteen cases) and hot stimulating foot-baths (fifteen cases) on the normal eye. His results are as follows: Hot full-baths generally produce pallor of the papilla in the normal eye on account of the diminution in the contents of the capillaries, a diminution in the contents of the arteries (sometimes perhaps also a slight dilatation of the veins), and marked diminution of the intra-ocular pressure owing to diminished intervascular pressure in the eye. The cause of these phenomena is found in the weakening of the heart's action and the diminished blood-pressure. When the latter does not occur, there are no changes in the eye. The author therefore thinks that hot full-baths will hardly find a place in ophthalmological therapeutics for the purpose of derivation. Hot foot-baths also have no derivative action; on the contrary, the author found the papilla redder, the retinal blood-vessels dilated, the intra-ocular pressure increased, while at the same time the intravascular pressure was increased and the pulse quickened. All these phenomena were the more marked the longer the bath lasted. The author therefore considers foot-baths contra-indicated in arterial hyperæmia of the fundus, but useful in venous hyperæmia. HIRSCHMANN.

NORTON (21) considers that the chief sphere of action of ice is to prevent or abort the various forms of inflammation of the eye, but for this purpose its use should be constant and not intermittent. BURNETT.

PFLÜGER (23) is in favor of antiseptics without reserve. For corneal ulcers he recommends iodoform. Diseases of the lachrymal sac are treated by making the tear-ducts permeable, and then injecting a mixture of boracic and carbolic acids; operations on the globe could then be safely performed. In 1883 sublimate in solutions of 1:10,000 was substituted for carbolic acid. Pflüger enters into very severe polemics against Steffan in regard to the use of antiseptics in cataract-extractions, with special reference

to the article of Steffan in the *Arch. f. Ophth.*, vol. xxix., 2, p. 191.

SATTLER (24) finds that chlorine water far surpasses all the other antiseptics thus far used in ophthalmology. Sublimate in solutions of 1:5,000 ranks equally high. Resorcin and hydrochinon can also be recommended; in some cases also the hydrogen binoxide. A very important paper for the knowledge of the use of antiseptics in ophthalmology.

III.—INSTRUMENTS AND REMEDIES.

25. ALBERTOTTI. Nota sopra alcuni strumenti di chirurgia oculare. *Italia medica*, No. 36.

26. DUJARDIN. Les accumulateurs d'électricité et la galvano-caustique oculaire. *Journ. des sci. méd. de Lille*, 1883, p. 930.

27. FRÖHLICH. Galvano-cautery. *Klin. Monatsbl. f. Augenheilk.*, Jan., 1884.

28. HARLAN. Fixation in testing the field of vision in central scotoma. *The Polyclinic*, Jan., 1884.

29. MCFARLAND, S. F. A personal experience with prismatic glasses. *Trans. Amer. Ophth. Soc.*, 1883.

ALBERTOTTI (25) describes a new forceps for the extraction of cysticerci, a modification of Desmarres' fenestrated pincette and Graefe's cataract-knife. DANTONE.

DUJARDIN (26) recommends the accumulator for galvano-cautery in ophthalmic surgery. MARCKWORT.

In cases of central scotoma it is very difficult to keep the point of fixation always the same. To overcome this, HARLAN (28) uses, instead of a dot or cross, a circle which is just large enough to lie outside the scotoma. The patient is then told to hold the eye so that the circle, as a whole, shall always be in view.

BURNETT.

MCFARLAND (29) has been using two prisms of 7° each bases in for seventeen and a half years, and is better satisfied with them than without them, as he is able to obtain and retain for a while binocular vision. Under the use of the prisms the interni seem to have become stronger. BURNETT.

30. AYRES. The use of atropine in determining glasses, and the influence of the vaso-motor system on the accommodation of the eye. *New Orleans Med. and Surg. Journ.*, vol. xi., No. 8.

31. V. HIPPEL. Therapeutical value of iodoform in diseases

of the eye. Med. Gesellsch. in Giessen. *Berl. klin. Wochenschr.*, No. 8.

32. PRINCE. Peroxide of hydrogen in suppurative conjunctivitis and mastoid abscess, with a report of two cases. *St. Louis Med. and Surg. Journ.*, March, 1884.

33. RAMPOLDI. Ancora delle injezioni ipodermiche di calomelano alle tempia nella terapia oculare. *Ann. di ottalm.*, vol. xiii., No. 1.

34. THEOBALD. Vaseline-cerate, a convenient basis for ointments intended for application to the eyelids. *Trans. Amer. Ophth. Soc.*, 1883. The cerate is made of one part of yellow wax to three or four of vaseline.

RAMPOLDI (33) still recommends subcutaneous injections of calomel at the temple, not only in inflammations of a syphilitic nature, hut also in phlogistic-exudative processes. That they are effective, he concludes from the fact that frequently the pupil dilated at once on the instillation of atropine after calomel had been injected, while previously mydriatics had produced no effect. DANTONE.

IV.—ANATOMY.

35. PFLÜGER. Congenital anomalies. *Ophthalmic Clinic of Berne University—Report for the year 1882.* Berne, 1884.

PFLÜGER (35) found the following congenital anomalies in one family, consisting of a mother and four children. In the mother and three children, total bilateral irideremia. In the mother and two children, opacities of the cornea. Opacities of the lens in all members of the family. In two children, persistent hyaloid artery. Nystagmus in the mother and three children. Ptosis in the mother and one child. In the oldest child, phthisis of the right and microphthalmus of the left eye. Former generations of the family had been healthy. The father is no relative of the mother, and has good eyes.

36. VAN DUYSE. Du colobome centrale ou maculaire. *Ann. d'ocul.*, Jan.-Feb., 1884.

VAN DUYSE (36) describes a case of coloboma of the macula lutea. The papilla was surrounded by a broad scleral ring, while bundles of opaque nerve fibres emerged from the lateral half of the optic nerve. In the region of the macula lutea there was a coloboma of the choroid of triangular shape ; the horizontal

diameter equalled 3 P. D., the vertical 1¾ P. D.; the retinal blood-vessels passed over the coloboma. While the eye was otherwise emmetropic, there was myopia in the region of the coloboma, which at its centre reached 4 D.; perception of light existed only over the inner half of the retina. Van Duyse discusses at length similar previous observations and the various theories designed to explain the development of a central coloboma; he thinks it is very difficult to reconcile the facts with a fœtal rotation of the globe. He considers that the best hypothesis which, without assuming a rotation of the globe, places the papilla and macula lutea into the fœtal eye-fissure, and thus explains the development of a central coloboma. MARCKWORT.

37. BUNGE. The field of vision and course of the fibres in the optical conducting apparatus. Halle, 1884.

38. VAN DUYSE. Contribution à l'étude des anomalies congénitales du nerf optique. *Ann. d'ocul.*, Mar.–Apr., 1884.

39. MAGNUS. Report of cases of congenital malformations of the optic nerve. *Klin. Monatsbl. f. Augenhk.*, Mar., 1884.

40. MAYER and PRIBRAM. Studies on the pupil. *Zeitschr. f. Heilk.*, vol. v., 1.

BUNGE (37) has made some excellent investigations on the region between the papilla and macula, and the nerve fibres supplying it. They are valuable for pathology, as well as for anatomy and physiology. A series of very characteristic illustrations shows the position of these fibres in the optic nerve, the chiasma, and optic tractus. The plates, however, are only explained in the text, which makes a rapid survey of them difficult.

VAN DUYSE (38) reports another case of coloboma of the optic-nerve sheath, and three cases of congenital conus, downward, of the optic nerve (*cf.* Fuchs, *Graefe's Arch. f. Ophth.*, vol. xxviii., 1, p. 139). MARCKWORT.

MAYER and PRIBRAM (40) found a centre of dilatation of the pupil in the spinal cord. The fibres for dilating the pupil, which pass through the cervical part of the sympathetic nerve, take their origin in this spinal centre.

41. MOTAIS. Anatomie et physiologie comparée de l'appareil moteur de l'œil. *Soc. franç. d'ophth.*, Jan. 31, 1884. *Centralbl. f. pract. Augenheilk.*, 1884, p. 113.

MOTAIS (41) found that Tenon's capsule consists of two leaves, an ocular and a muscular leaf; the latter extends to the margin of

the cornea, and detaches itself at the height of the equator of the eye in the shape of a circular diaphragm, and then inserts itself at the walls of the orbit. The muscular leaf encloses the muscles like a sheath, after their passage through the diaphragm. Fibres pass from the sheaths of the muscles to the diaphragm and the lateral edge of the orbit.

V.—PHYSIOLOGY.

42. BERLIN. The power of judging depth and distance in animals, and demonstration of an apparatus. *Rep. on the XV. Meeting of the Ophth. Soc.*, Heidelberg, 1883. Rostock, 1883.

43. NICATI. De l'acuité visuelle binoculaire. *Soc. franç. d'ophth.*, Jan. 29, 1884.

44. WADSWORTH. On the apparent curvature of surface, produced by prisms. *Trans. Amer. Ophth. Soc.*, 1883.

BERLIN (42) remarks that the horse can judge of distances much better than man, but only by means of binocular fixation. The power of perceiving the third dimension seems to be much more developed in animals than in man.

NICATI (43) believes that by producing perfect binocular fixation he can bring about an increase in the power of vision equal to that produced by doubling the intensity of illumination. He assumes that the perceptions of light of homologous points of the retina are united in a common centre and added to each other.

This familiar phenomenon is explained by WADSWORTH (44) by the action of the prisms (when their bases are turned in) in bringing the rays from the peripheral parts of a plane to fall on the retina more and more closely to those coming from the centre of the plane; in other words, the retinal image is shorter in its horizontal direction than it is in the unarmed eye, and has the same form as it would have, had the image come from a curved surface. In the Reviewer's opinion, Wadsworth has not taken sufficiently into consideration the part played by the extrinsic muscles and the law of projection in the phenomenon.

BURNETT.

45. LANDESBERG. Does the mechanical irritation of the optic nerve produce the sensation of light? *Klin. Monatsbl. f. Augenhk.*, Jan., 1884.

46. STARR. The visual area of the brain. *Amer. Jour. Med. Sci.*, Jan., 1884.

STARR (46) gives no original cases or experiments, but from the mass of facts contributed by others, he concludes that the function of sight has its seat in the occipital lobes, and that the right lobe receives impressions from the right half of both eyes, and the left lobe those from the left half of both eyes.

BURNETT.

47. LAQUEUR. Ophthalmometric investigations on the curvature of the cornea under normal and pathological conditions. *Bericht über d. XV. Versamml. d. Ophth. Ges.*, Heidelberg, 1883. Rostock, 1883.

LAQUEUR (47) always found the curvature of the cornea diminished in the horizontal meridian in the periphery, and more at the inner than at the outer end on account of the position of the ∠ *a*; in the vertical meridian, on the contrary, the diminution of curvature is less marked either above or below, while in some cases there was no decrease whatever in the upper portion, and the periphery of the cornea had the same curvature as at the line of vision. In other cases the lower half of the vertical meridian showed the least diminution in curvature, while in the upper half it was like that of the horizontal meridian. Traction of the upper lid produces regular astigmatism, consisting in a diminution of curvature of the horizontal, and a corresponding increase of that of the vertical, meridian. The measurements have shown that the astigmatism of the lens is of very little consequence; in one third of all cases there was none whatever, the astigmatism of the cornea being equal to the total astigmatism; in about another third the astigmatism of the lens and cornea were homonymous; in the last third it was the reverse of the corneal astigmatism and neutralized it either entirely or partially. In five cases of keratoconus a high degree of regular astigmatism was found, the correction of which materially improved vision. In extreme degrees of ametropia no unusual value of the radius of curvature was found. Glaucoma does not seem to have any material influence on the curvature of the cornea, and the presupposed diminution apparently does not exist. Linear extraction, according to Graefe, always leaves a certain degree of astigmatism, generally reducing the curvature of the vertical meridian, and in young people especially to a considerable extent. The operation for strabismus and pterygium does not affect the curvature of the cornea.

48. GRABER. Outlines for investigating the perception of light and color in animals. Prague and Leipzig, 1884. 322 pp., 8vo, price 7.50 Mk.

49. Hilbert. The association of sensations of taste and smell with colors and of sounds with form-conceptions. *Klin. Monatsbl. f. Augenhk.*, Jan., 1884.

50. Hilbert. Contributions to the knowledge of color-blindness. *Arch. f. d. ges. Phys.*, vol xxxix., 5 and 6.

In the present volume Graber (48) has embraced all his experiments on different animals. They were made with great faithfulness, but their conclusiveness does not seem entirely beyond doubt. It will always be difficult to draw conclusions as to the existence and nature of the sense of light and color in animals, from the mere fact that the animal experimented upon preferred one shade of color or one intensity of light to another. The following are some of the facts found by him. 1. There is no uniformity whatever among animals in regard to their preference for colors. Thus he disposes of the strange assertion of Grant Allen, that man and animals have the same color-sense. The erroneousness of this assertion had been pointed out by the Reviewer a few years ago, in an exhaustive paper. 2. In some animals the constancy of their reaction to color is very remarkable ; in others there is none whatever. 3. The effect of two lights of different color is in general the greater, the farther apart they are in the spectrum. This seems to indicate that in choosing between two lights of different color, the animal is influenced by other factors besides the quality of the light. 4. Most animals possess a greater or less degree of sensibility for the ultra-violet rays. 5. Animals that prefer white also prefer blue, while those preferring dark colors seem to favor red. The bibliography is very defective, many of the latest and most important researches having been overlooked.

Hilbert (49) observed that in a lady unpleasant sensations of taste or smell produced conceptions of color; weak ones giving rise to bright shades of color, strong ones to dark shades.

The red-green blind can be arranged according to Hilbert (50) in three groups: one has a markedly shortened spectrum (red-blind of Holmgren), the second a slightly shortened spectrum (green-blind of Holmgren), and the third, lying between the two, has a spectrum of medium extent. The color-blind are very sensitive to differences in intensity of illumination ; the explanation is that the brightness of colorless objects can be judged of more readily than that of colored objects.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

BY DR. HORSTMANN.

51. LANDOLT. L'état actuel de la question de la myopie. *Arch. d'ophth.*, 1884, vol. iv., 1, p. 1.

52. VISION OF PUPILS IN THE PUBLIC SCHOOLS OF SPRINGFIELD, MASS. *Report of School Committee of the City of Springfield, for 1884.*

53. DERBY, H. Influence on the refraction of four years of college life. *Trans. Amer. Ophth. Soc.*, 1883.

54. LAYET. Hygiène de la vue dans l'écriture. *Gaz. hebd. des sci. méd. de Bordeaux*, 1884, No. 43.

55. LANDESBERG, M. Some new facts about astigmatism. *N. Y. Med. Jour.*, Jan. 5, 1884.

56. LEROY, C. J. A. De la kératoscopie ou de la forme de la surface cornéenne déduite des images apparentes refléchies par elle. *Arch. d'ophth.*, 1884, vol. iv., 2, p. 140.

LANDOLT (51) treats the question of progressive myopia in a very lucid and comprehensive manner. While fully considering the literature of the subject, Landolt criticises the various theories in regard to the cause of myopia and the development of posterior staphyloma. He finds that our knowledge of the subject has not been materially advanced since the appearance of Donders' classical work in 1864. All explanations thus far attempted contain something of truth. It is probably impossible to give one and the same explanation for all cases of progressive myopia; its causes are too various, and act both singly and combined, and unite in producing effects of which we scarcely can form a conception. If statistics shall be of greater value than heretofore, it is necessary to examine vision and the fundus, besides determining refraction both subjectively and objectively, and also take into consideration the general health, conformation of the skull, heredity, and occupation of the individual both in and out of school; the investigations however should not be confined to the school. Landolt thinks that predisposition is very probable. V. MITTELSTÄDT.

The examinations of the pupils of the SPRINGFIELD (52) schools were made by Dr. W. W. Gardner, and we subjoin the statistics of the examinations: number of pupils examined, 1,082; perfect vision, 886; defective vision, 196; errors of refraction, 372; manifest H, 291; M, true or spasmodic, 81; Ast., 69; color-blindness,

7; range of H, 0.5–4.5 D.; range of M, 0.5–18 D.; percentage of M in lower grades, 4; same in higher grades, 10; same in grammar-schools, 6; same in high-schools, 14; same in sophomores in high-schools, 21. BURNETT.

DERBY (53) examined 254 of the graduating classes at Amherst College, having previously examined the condition of their refraction at entrance. A comparison of the results of each examination gives the following percentage: H at entrance, 15.4; at graduation, 18.5; M at entrance, 35.4; at graduation, 47.2; E at entrance, 49.2; at graduation, 34.3. Average H at entrance, 0.7 D.; at graduation, the same. Average M at entrance, 1.8 D.; at graduation, 2.4 D. Of E there were at entrance 125 cases; of these 86 remained so, 10 became hyperopic, and 29 myopic. BURNETT.

In this communication LANDESBERG (55) maintains his former thesis in regard to the transitory character of certain instances of regular astigmatism. He has recorded thirteen more cases in addition to the fourteen reported in *Graefe's Arch.*, vol. xxvii., 2. The conditions under which regular astigmatism may develop are: progressive M, with and without spasm of accommodation, and spasm of A in any form of eye. The full histories of three cases are given. BURNETT.

57. EALES. Paralysis of convergence and accommodation. *The Lancet*, 1884, No. 3.

58. SCHMIDT-RIMPLER, H. Paralysis of accommodation after diphtheria of the pharynx. *Berl. klin. Wochenschr.*, 1884, No. 7.

EALES (57) observed paralysis of convergence and accommodation in a girl æt. thirteen. There was no associated contraction of the pupils, though they reacted promptly on light. The child was otherwise perfectly well.

Jacobson found that while the paralysis of accommodation lasts the far-point is moved farther off; that the true refraction of the eye is therefore higher than during the paralysis. SCHMIDT-RIMPLER (58) believes that this condition can only be explained, in accordance with the investigations of Weiss, by assuming that the atropinization afterward was insufficient to overcome the renewed accommodative effort.

VII.—LIDS AND SURROUNDINGS.

59. DORNIG. Case of gummous affection of the lids. *Vierteljahrsschr. f. Dermatologie u. Syphilis*, vol. x., 3 and 4.

60. ADAMS, J. Chancre on the mucous membrane of the

upper lid with marked adenopathy of three weeks' duration. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 4.

61. WILLIAMS. Specific ulcer of the edges of the eyelid. *St. Louis Med. and Surg. Journ.*, xlvi., p. 349.

62. DOHNBERG. The operative treatment of inward version of the eyelashes and lids. *Wjestnik Ophth.*, 1884, No. 1, p. 1.

63. STREATFEILD. Transplantation for eversion of lower lid. *The Lancet*, 1884, No. 12.

64. PARANT, LÉON. Traitement du trichiasis et de l'entropion par la tarsoplastie. *Thèse de Lyon*, 1883.

65. DOR, H. D'un nouveau procédé pour opérer le trichiasis et l'entropion. *Lyon méd.*, Oct. 3, 1883.

66. GRUENING, E. Case of blepharoplasty according to Wolfe. *Trans. Amer. Ophth. Soc.*, 1883.

DOHNBERG (62) concludes, from a close scrutiny of the customary methods of operating for trichiasis and entropium, that that of Hotz is the most rational, but insufficient for all severer cases. It has, however, the advantage that it can easily be combined with other methods. In most cases the author adopts a combination of Hotz's operation with that of Snellen, sometimes with that of Jaesche-Arlt. The latter combination he only uses in cases in which there is less of entropium and curvature of the tarsus and more of trichiasis. It generally produces a perceptible disfigurement of the lid, which in the first combination is not the case. The author operates as follows : After performing canthoplasty, a Knapp lid-clamp, as modified and enlarged by the author, is inserted. After incising the skin to the tarsus in the whole extent of the clamp (6–7 *mm.* from the edge of the lid and parallel to it), a narrow strip of skin and muscle (2–4 *mm.* wide) is abscised from the upper edge of the wound, so that the tarsus and fascia tarso-orbitalis are exposed ; then a wedge-shaped piece of tarsus is excised according to Snellen. Three sutures are then inserted (but not yet tied) through the lower edge of the wound, then through the upper edge of the tarsal wound and the fascia, and finally through the upper edge of the wound in the skin, so that the lower edge can unite with the tarsus or fascia. The lid-clamp is now removed, the bleeding stilled, the length of the wound increased with scissors at its medial end almost to the nose, at its lateral end beyond the outer commissure ; oval or triangular pieces of skin excised at both ends, the muscle removed

to the aponeurosis from the spots thus exposed, and sutures applied (through the lower edge of the wound, the aponeurosis, and the upper edge); all sutures tied, and a sublimate bandage ($\frac{1}{10}$ %) applied. The sutures are removed about four to five days afterward. Relapses are very rare. HIRSCHMANN.

STREATFEILD (63) operated a case of ectropion, the result of an affection of the bone due to lues, by transplanting a flap without a pedicle from the forearm. The upper half took hold, so that there was a marked improvement.

PARANT (64) recommends Gayet's as the best method for operating trichiasis and entropium; sixteen reported cases gave good results. v. MITTELSTÄDT.

DOR (65) operates for trichiasis and entropium by making an undermined flap, occupying the edge of the lid and parallel to it, of the same breadth throughout, and containing the misplaced lashes. Just above this a flap of skin and muscle is formed of the same width, its basis upward, and its free lower edge beside the upper edge of the undermined flap. The upper flap is then pushed through under the lower. The skin of the upper flap is then incised parallel to the lower, and the latter fitted into the defect; then sutures. v. MITTELSTÄDT.

GRUENING (66) performed blepharoplasty on a boy, æt. seventeen. The lid (lower) was prepared in the usual way by loosening its attachments, and the edges of the two were united by three interrupted sutures, leaving a raw surface, 40 × 55 *mm.* A flap was then taken from the skin over the biceps of the left arm, measuring 70 × 50 *mm.* The adipose and cellular tissues were removed, while the flap was still attached by a small bridge of skin. The raw surfaces were washed with a saturated solution of boracic acid, and freed perfectly from blood coagula. The flap was trimmed so that it fit the surface accurately, no puckering being allowed. No sutures were used, but it was covered with goldbeater's skin and a compress of borated cotton applied.

BURNETT.

VIII.—LACHRYMAL APPARATUS.

67. GOLDZIEHER. Foerster's streptothrix in the lower lachrymal duct. *Centralbl. f. pract. Augenhk.*, 1884, p. 33.

68. REUSS, A. v. Concretions of fungi in the lachrymal ducts. *Wiener med. Presse*, 1884.

69. CAMUSET. Tumeurs à leptothrix des voies lachrymales. *Journ. de méd. et de chir. pract.*, August, 1883, p. 366.

70. RAMPOLDI. Un caso di lussazione della glandula lagrimale. *Ann. di ottalm.*, vol. xiii., 1, p. 70.

71. MORTON, STANFORD. Congenital unilateral absence of lachrymation. *The Lancet*, 1884, No. 3.

72. AYRES, S. C. Extirpation of the lachrymal sac. *Amer. Journ. of Ophth.*, 1884, vol. i., 1, p. 17.

According to CAMUSET (69) masses of leptothrix develop at the junction of the tear-ducts, and grow towards the lachrymal sac, which they can fill up entirely. V. MITTELSTÄDT.

In a case of cicatricial ectropion of the upper lid observed by RAMPOLDI (70) the two lachrymal glands were dislodged and forced into the outer commissure, making their abscision necessary.

IX.—MUSCLES AND NERVES.

73. MAKLAKOFF. L'ophthalmomyotomie. *Arch. d'ophth.*, 1884, vol. iv., No. 3, p. 239.

74. SCHERK. On strabismus. *Deutsche med. Wochenschr.*, 1884, No. 19.

75. TWEEDY, J. On the operation for the correction of secondary divergent strabismus. *The Lancet*, 1884, No. 12.

76. FERRI. Di un nuovo strumento pro misurare l'insufficienza dei muscoli esteriori dell' occhio. *Giorn. de R. Accad. di Med. di Torino*, Feb., 1884.

77. EVERSBUSCH, O. Case of nystagmus. *Zehender's klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 45.

78. MASINI, G. Contribuzione alla cura dei dolori ciliari con lo strappamento del nervo nasale externo. *Boll.*, vol. vi., No. 9, p. 204.

79. NOTHNAGEL. On paralysis of the oculomotor nerve. *Wiener med. Presse*, 1884, No. 10, p. 306.

80. ORMEROD. Paresis of ocular muscles. *The Lancet*, 1884, No. 12.

81. GOWERS. Spasm of the ocular muscles. *The Lancet*, 1884, No. 12.

In operating for strabismus, MAKLAKOFF (73) used for dividing the tendon a squint-hook, the inner edge of which was sharpened. It somewhat resembles an instrument which Schöler recommended a few years ago for dividing the optic nerve in enucleation.

SCHERK (74) recommends abscision of a piece of the tendon in high degrees of strabismus.

The instrument of FERRI (76) consists of a fixed prism, base upwards. At a distance of 25 *cm.* there is a screen with the point of fixation and a system of parallel lines, whose distance apart equals one degree. If there is insufficiency of the muscles, the eye looking through the prism will see the point of fixation, not exactly below the point seen by the other eye, but in one of the spaces between the lines, thus giving the exact deviation in degrees.

DANTONE.

EVERSBUSCH (77) observed horizontal nystagmus in a man, which ceased in the median line.

NOTHNAGEL (79) discusses several cases of bilateral paralysis of the oculomotor nerve. In one case the cause was polioencephalitis anterior atrophica chronica; in a second, a tumor in the vermis of the cerebellum, which extended into the corpora quadrigemina; and in a third, a dilatation of both posterior cerebral arteries, which had produced atrophy by pressure on both oculomotor nerves.

ORMEROD (80) saw a man who could not look upwards. When he tried to do so, vertical nystagmus resulted. The other movements of the eye were normal. This condition lasted ten months.

GOWERS (81) found that muscles of the eye can participate in chorea. Transitory diplopia from this cause was not uncommon.

X.—ORBIT AND NEIGHBORING CAVITIES.

82. POOLEY. Cellulitis of the orbit. *N. Y. Med. Journ.*, Mar., 1884.

83. GRIFFITH HILL. Case of primary orbital cellulitis; death on seventh day; post-mortem examination. *Ophth. Rev.*, 1884, vol. iii., No. 31, p. 147.

84. PUÉCHAGUT. De la ténonite ou inflammation de la bourse celluleuse rétro-oculaire d'origine rheumatismale. *Thèse de Paris*, 1884.

85. MAGNUS, H. Periodic left-sided exophthalmus on bending the head. *Zeh. klin. Monatsbl. f. Augenhk.*, 1884, vol. xxii., p. 62.

86. BRINCKEN, VON. Retrobulbar cavernoma in a child two and a half years old. *Zeh. klin. Monatsbl. f. Augenhk.*, 1884, vol. xxii., p. 129.

87. LEDIARD. Exostosis of orbit. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 23.

88. Lawson. Congenital tumor of orbit. *Brit. Med. Journ.*, Oct. 20, 1883, p. 773.

89. Critchett, A., and Juler, H. Sarcoma of orbit in a child. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 8.

90. Pollak. Melano-sarcoma of orbit. *St. Louis Med. and Surg. Journ.*, vol. xlvi., pp. 153 and 169.

91. Dieu. Kystes hydatiques de l'orbite. *Rec. d'ophth.*, No. 1, p. 6.

92. Caudron. Kyste hydatique de l'orbite. *Gaz. des hôp.*, 1884, No. 14.

93. Norton, G. S. Secondary hemorrhage after enucleation of the eye. *American Homœopath.*, Jan., 1884.

94. Jackson, H. Fracture of the orbital plane of frontal bone and perforation into lateral ventricle of brain; death; autopsy; remarks. *The Lancet*, 1884, No. 4.

Magnus (85) observed, in a healthy boy of thirteen, that as soon as he bent his head forward, exophthalmus of the left globe, combined with dislocation downward and outward, ensued. Varicose veins of the left side of the head were the cause.

Brinckeen (86) removed from the orbit a retrobulbar angioma 3.5 *cm.* long, 3 *cm.* broad, and 2.5 *cm.* thick. The eye could not be preserved.

Lediard (87) reports a case of exostosis of the orbit which was situated half-way between the left upper eyelid and eyebrow. It gradually loosened, spontaneously separated one day, and finally fell out. It weighed 9½ oz. Fitzgerald.

Lawson (88) observed a congenital tumor of the orbit which seemed to have originated in the body of the sphenoid bone. It contained numerous cysts, and consisted mainly of hyaline cartilage. Fitzgerald.

Dieu (91) punctured a hydatid cyst of the orbit in a young Arab woman, and put in a drain. The exophthalmus disappeared, but the eye remained blind on account of atrophy of the optic nerve. The author has collected twenty-five similar cases described by others, and draws conclusions as to the anatomical and clinical conditions of these cysts. v. Mittelstädt.

Caudron (92) observed exophthalmus of the right eye in a soldier æt. twenty-two, which began fourteen months ago. Six *mm.* from the inner edge of the cornea a tumor springs from the sclera, not movable upon it, its upper margin only distinctly de-

fined and covered by the thickened and very vascular conjunctiva. Ophth.: choked disc. V (r.) = $\frac{1}{6}$. General health good. A large quantity of pus escaped when the tumor was incised. A membrane obstructing the opening was incised, whereupon hydatid liquid flowed out. Drainage, healing with V = $\frac{20}{60}$ after remnants of a cyst had been discharged, showing the structure of hydatid cysts. Caudron thinks that a hydatid cyst in the orbital fat had produced an abscess in the tissue lying in front of it, and had thus masked the true nature of the tumor until the opening of the cyst-wall disclosed it. V. MITTELSTÄDT.

NORTON (93) reports two cases of secondary hemorrhage after enucleation. In one there was evidently a hemorrhagic diathesis, but not in the other. In the first case the bleeding ceased after the application of punk, in the other after the administration of persulphate of iron and injections of ice-water into the orbit.

BURNETT.

95. GROS. Étude sur le goître exophthalmique. *Thèse de Paris*, 1884.

96. ROHM. On the extirpation of goitre in morbus Basedowii.

GROS (95) does not consider goitre an affection of the nerve centres, spinal cord, and medulla. The vasomotor nerves only act as connecting links. V. MITTELSTÄDT.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

97. SCHATZ. Blennorrhœa neonatorum in the Grand Duchy of Mecklenburg-Schwerin. *Deutsche med. Wochenschr.*, 1884, No. 1.

98. AHLFELD, J. The application of prophylactic instillations against blennorrhœa neonatorum. *Deutsche med. Wochenschr.*, 1884, No. 3.

99. GIELEN. Boracic acid in ophthalmology. *Deutsche med. Wochenschr.*, 1884, No. 10.

100. CONNEN. Du traitement prophylactique de l'ophthalmie des nouveau-nés par l'acide borique. *Thèse de Paris*, 1884.

101. CRITCHETT, A., and JULER, H. Case of chronic membranous conjunctivitis. *Trans. Ophth. Soc. Unit. King.*, vol. iii. p. 1.

102. SEELY, W. W. Notes on ocular therapeutics. *Trans. Amer. Ophth. Soc.*, 1883.

103. TÆNZERLES. Observations on the application of iodoform in diphtheritic conjunctivitis. *Wiener med. Presse*, 1884, No. 13, p. 403.

SCHATZ (97) saw good results from the prophylactic instillation of a 2-% solution of nitrate of silver against blennorrhœa neonatorum.

GIELEN (99) recommends a 4-% solution of boracic acid in blennorrhœa, as the 2-% solution of nitrate of silver generally employed easily decomposes (? REV.).

CONNEN (100) recommends instillations of a 3-% solution of boracic acid against blennorrhœa neonatorum, as a result of an experience of six months in the gynecological clinics of Paris; the percentage was reduced from 12.68 to 4.76 (why not Credé's method? REV.). V. MITTELSTÄDT.

SEELY (102) thinks the irritating effects of some samples of yellow oxide of mercury due to the presence of a bichloride. He uses the bichloride in a strength of 1 : 7,000 or 8,000 in acute catarrhal conjunctivitis, and also as an antiseptic in various operations. He employs eserine in a 4-gr. solution in corneal affections, and such a solution once a day in iritis in addition to the mydriatic. Since using eserine in increased tension he has had no occasion to perform paracentesis. BURNETT.

TÆNZERLES (103) observed diphtheria of the conjunctiva and labia in a child suffering from variola; insufflation of iodoform improved the condition.

104. BAUMGARTEN. Some remarks on the histology of trachoma. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 1, p. 277.

105. PRATO GONZÁLES. Granulaciones de la conjunctiva. *Revista special de oftalmologica*, Apr., 1884.

106. WOUKCHEWICH. Étude sur le traitement de l'ophthalmie granuleuse par l'excision du cul-de-sac conjunctival. *Thèse de Paris*, 1884.

107. DUJARDIN. De l'emploi du sublimé dans l'ophthalmie granuleuse. *Journ. des sci. méd. de Lille*, 1884, No. 2. *Rec. d'ophth.*, 1884, No. 1.

108. GRIGORIEW, J. P. Statistical material on the etiology of trachoma. *Militär. Med. Journ.*, Dec., 1883.

WOUKCHEWICH (106) recommends conjunctival excision in old cases of trachoma. Thirty clinical histories.

V. MITTELSTÄDT.

DUJARDIN (107) saw good results in six cases of trachoma follow the application of a solution of one part sublimate to ten of alcohol and 240 of water. In this concentration the solution is intended to produce the inflammation necessary for absorption and to kill the bacteria. Stronger solutions can therefore not be recommended ; rather more frequent application of a weaker one.

V. MITTELSTÄDT.

109. NEISSER. On the nature of the jequirity-ophthalmia. *Fortschritte d. Med.*, 1884, No. 3.

110. SALOMONSEN and DIRCKNIK-HOLMFELD. On the etiology of the jequirity-ophthalmia. *Fortschritte d. Med.*, 1884, No. 3.

111. KLEIN, E. Contributions to the etiology of the jequirity-ophthalmia. *Centralbl. f. d. med. Wissenschr.*, 1884, Nos. 8 and 11.

112. VOSSIUS, A. The curative results of the jequirity-ophthalmia. *Berlin. klin. Wochenschr.*, 1884, No. 17.

113. DE WECKER, L. Jequirity-ophthalmia. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 1, p. 259.

114. BRUYLANT and VENNEMANN. Le jéquirity et son principe pathogène. *Bullet. de l'acad. royale de méd. de Belgique*, 1884, No. 1.

115. MANFREDI. Jequirity. *Mem. d. R. Acad. di Modena*, Feb. 1884 ; *Bolletino*, vol. vi., 8, p. 195.

116. CASPODI. Jequirity and its manner of action. *Wiener med. Wochenschr.*, 1884, No. 11. *Rec. d'ophth.*, 1884, 3, p. 155.

117. CHAUZEIX. Le jéquirity et son emploi en ophthalmologie. *Thèse de Paris*, 1884.

118. GALEZOWSKI and PARISOTTI. Du jéquirity et de son insuccès dans le traitement des granulations. *Rec. d'ophth.* 1884, No. 1, p. 31.

119. EWSEJENKO. Treatment of pannus without jequirity. *Med. Wjestnik*, 1884, No. 13.

120. SIMI. Jequirity. *Boll. d'ocul.*, vol. vi., Feb. 6, 1884.

121. KOLLOCK, C. W. Jequirity in eye-disease. *Med. News*, Dec. 15, 1883.

122. FANO. Action désastreuse exercée sur un œil par des lotions avec decoction de jéquirity. *Journ. d'ocul., et de chir.*, Nov., 1883.

123. JEQUIRITY-TREATMENT. Discussion of the *Soc. franç. d'ophth.*, Jan. 21, 1884.

NEISSER (109) denies that the jequirity-ophthalmia is an infectious disease produced by the bacilli found by Sattler. He found that the infusion acted only so long as no bacilli had developed in it. Inoculation with cultivated bacilli always failed. He never succeeded in finding the characteristic bacilli either in the secretion or in the tissue itself of the chemotic conjunctiva. He only saw the same micrococci as those found in conjunctivitis produced by ammonia. Attempts at inoculation with the secretion of the ophthalmia or with conjunctival shreds likewise failed.

SALOMONSEN and DIRCKNIK-HOLMFELD (110) came to the same conclusion. They found that the jequirity-ophthalmia is not produced by bacteria, but by a poison contained in the seed, which is soluble in water and glycerine, but insoluble in alcohol, ether, benzine, and chloroform.

KLEIN (111) also concludes from numerous experiments that the ophthalmia is not due to microbes.

VOSSIUS (112) is unequivocally opposed to the use of the infusion, as it neither cures the granulations nor exerts a beneficial influence upon the pannus, and in mild cases of pannus may even endanger the cornea.

DE WECKER (113) defends his views as to the efficacy of jequirity, in opposition to v. Hippel's strictures, and maintains that it cures true granulations and trachoma, but makes false granulations rather worse than better.

According to the communications of BRUYLANT and VENNEMANN (114) to the Belgian Academy of Medicine the action of jequirity is due to an unorganized ferment which develops when the seeds sprout. The authors produced, while observing all necessary precautions, an infusion of finely powdered seeds, free from bacilli, one drop of which produced an intense conjunctivitis in the rabbit. Out of ten three died after a few days. When this infusion was heated to 65° C. for half an hour, it completely lost its efficacy and remained so, although several days afterward the characteristic bacilli had developed. The method of preparing the ferment and its chemical and physical properties are described; it produces inflammation very readily: 0.00001 or even half of this, sets up the jequirity-ophthalmia in the rabbit. In man ½ *m.* is necessary; in well-developed granulations or dense cicatricial tissue more is required. Subcutaneous and in-

travenous injections of jequiritine, as well as internal doses, kill the animals in from seven to twenty-four hours, under the symptoms of gastro-enteritis, weakness of the heart, and almost complete prostration. v. MITTELSTÄDT.

MANFREDI (115) does not think that the jequirity-ophthalmia is produced by microbes; for, if one part of pulverized beans is macerated in one hundred parts of a 1-% solution of carbolic acid, or a 4-% solution of boracic acid, or in glycerine, the powder does not lose its efficacy. Even the precipitate obtained with tannin, sublimate or acetate of lead, from the maceration in glycerine, is effective. He never could transmit the ophthalmia by inoculation. DANTONE.

CASPODI (116) is opposed to the bacillus-theory of Sattler. Although he says that after the jequirity treatment "maculæ may remain behind on a previously clear cornea," he is, on the other hand, of the opinion that every oculist will consider jequirity an important remedy. MARCKWORT.

CHAUZEIX (117) recommends jequirity not only for trachoma, but also for scrofulous, pannous, and ulcerative corneal affections, and bases this advice on the observation of fifty cases at de Wecker's clinic. In papillary hypertrophy it fails. v. MITTELSTÄDT.

GALEZOWSKI and PARISOTTI (118) report four cases observed by de Wecker himself, in which one or several applications of jequirity produced no effect upon the granulations. In two of the cases corneal ulcers had resulted, one of these complicated with prolapse of iris. v. MITTELSTÄDT.

Based upon his own observations and those of others, EWSEJENKO (119) doubts the curative action of jequirity in pannus, considering this affection almost exclusively the result of mechanical irritation of the cornea by the granulations. He has been endeavoring for a long time to diminish the mechanical irritation by the use of various fats. In oleum nucum juglandis he thinks he has found an oil which, instilled several times a day into the eye for two to three weeks, caused marked pannus to disappear; even pannus with beginning softening of the cornea was completely cured in six to eight weeks. The granulations should be touched at the same time with sulphate of copper. HIRSCHMANN.

SIMI (120) saw most intense general symptoms follow the thrice-repeated application of jequirity in a girl of eighteen. Twenty-four hours after the first application the characteristic inflamma-

tion of the conjunctiva had developed, and extended through the whole lachrymal canal and to the naso-pharynx. Temperature 40.5° C. Twenty-four hours later the temperature had risen to 41.5°, the patient became very restless, and complained of headache and nausea. The soft palate, uvula, and tonsils were red and swollen, the tonsils covered with a whitish exudation ; difficulty of breathing and deglutition ; externally, swelling of the neck and submaxillary region. All these symptoms rapidly disappeared after the third day ; three weeks later the trachoma was almost gone ; only the tumor in the lachrymal sac remained and probably must be operated. DANTONE.

KOLLOCK (121) concludes that jequirity acts beneficially in chronic cases only, and is contra-indicated in acute cases.

BURNETT.

FANO (122) observed violent reaction, with perforation of the cornea and atrophy, after the application of jequirity-infusion, repeated six times, in a girl eight years old, with buphthalmus, infiltration of both corneæ, and much impaired vision.

V. MITTELSTÄDT.

COPPEZ (123) made use of jequirity in 164 cases of conjunctivitis granulosa, 140 of which were complicated with pannus ; of these 140, 78 were cured (Relapses ? REV.). Jequirity is also an excellent remedy for stimulating the vascularization of the cornea in atonic ulcers of the cornea and asthenic parenchymatous keratitis. Peiron Menacho concludes from 300 cases observed at de Wecker's clinic that jequirity acts beneficially in scrofulous pannus, parenchymatous keratitis, and sclerosis. Vallez used jequirity in 25 cases of granular conjunctivitis, and obtained 10 excellent and 10 good results and 5–6 failures. Abadie would treat only inveterate cases of granular conjunctivitis with jequirity. Nicati divides the course of granular conjunctivitis into three stages ; he thinks jequirity is indicated only in the third ("periode fongueuse"). Dor has obtained equally good results with the old remedies as with jequirity. Galezowski treated 10 cases with jequirity ; in some of them the result was at first satisfactory, but relapses were not prevented. Terson obtained excellent results with jequirity, especially in that stage of trachoma in which scars are intermingled with the granulations. Vacher had striking success in 10 cases out of 11 treated with jequirity. Armaignac treated a case of trachoma affecting both eyes with jequirity, and obtained a good result in one eye, but failed in the other. Gayet

treated 30 children affected with trachoma with jequirity, but failed to obtain a single clearly good result. Later trials also failed. Vennemann thinks the active principle of jequirity is a ferment. According to Boucheron the results with jequirity are very poor when it is applied in the first stage of trachoma, or in acute cases. Landolt found that in the first stages of trachoma no remedy surpasses the sulphate of copper ; jequirity should be reserved for the inveterate cases in which sulphate of copper failed. Panas is very cautious in expressing his views. Judging from his limited experience jequirity can only be applied in chronic cases, which had resisted other methods, but are cured with the new remedy with certainty. It seems to be especially effective in corneal opacities. One case of xerophthalmia was very much improved. Parinaud seeks the cause of the contradiction in the results obtained by Gayet and Coppez in the different age of the patients. Sulphate of copper has always been good enough for Parinaud. Are there no relapses in jequirity cases? Chibret and Grand attribute the difference in results to the different geographical conditions. Parisotti reviews a paper by Fortunati (Giorn. internaz. de scienze med., anno 5), who has compiled a number of Italian articles on this subject. Among 140 cases 20 partly unsatisfactory results. According to de Wecker, the jequirity question is not yet ripe for decision ; but it is certain that the remedy is contra-indicated in the acute stage. Wecker supports Sattler's opinion against that of Vennemann (*v.* above) by the following experiment : Martineau applied jequirity to the vagina without producing any effect ; the inflammation did not set in until air had been admitted. MARCKWORT.

124. HIRSCHBERG, J. Operation for symblepharon. *Centralbl. f. pract. Augenhk.*, 1884, p. 144.

125. RAMPOLDI and STEFANINI. Angioma primitivo della congiuntiva. *Ann. di ottalm.*, vol. xiii., 1, p. 74.

126. THALBERG. The question of xerosis of the conjunctiva. *Wjestnik*, 1884, i., p. 13.

HIRSCHBERG (124) succeeded in curing a case of symblepharon after facial erysipelas, by transplanting a flap without a pedicle from the mucous membrane of the mouth.

In the two cases of angioma of the conjunctiva mentioned by RAMPOLDI and STEFANINI (125), the tumor in one of them occupied the lower cul-de-sac ; in the other it was next to the caruncle.

DANTONE.

Besides the usual xerosis epithelialis occurring in sucklings and weakened individuals, THALBERG (126) describes another form, which he observed in four soldiers of the guard-regiment. A white, superficial infiltration of the epithelium develops, more frequently in the lower than in the upper fornix, which lasts for some time, constantly relapses (for months), is followed by moderate reaction, and resembles the eschar of lunar caustic. He attributes it to scurvy. HIRSCHMANN.

127. MEYHÖFER. Remarks on serpent ulcer and the treatment of corneal ulcer by scraping and iodoform. *Zehender's klin. Monatsbl. f. Augenhk.*, 1884, vol. xxii., p. 151.

128. HEISRATH. Treatment of corneal opacities. *Deutsche med. Wochenschr.*, 1884, No. 2.

129. ORTMANN, P. Experimental investigations on central keratitis. *Inaug. Diss.* Königsberg, 1884.

130. KUHNT, H. Proposal of a new method of treating certain forms of corneal ulcer. Wiesbaden, Bergmann, 1884.

131. NIEDEN, A. Two cases of neuro-paralytic keratitis. *Arch. f. Augenhk.*, vol. xiii., p. 249.

132. PROUFF, J. M. De la sclérotoscopie. Méthode à suivre pour les observations ayant trait à la kératite prétendue astigmatique. *Rev. clin. d'ocul.*, 1884, No. 2, p. 25.

133. ANGELUCCI. Sulla refrazione e correzione delle cornée coniche ed ectatiche. *Ann. di ottalm.*, vol. xiii., 1, p. 35.

134. WECKER, DE, et MASSELON. La kératoconométrie. *Rev. clin. d'ocul.*, 1884, i., p. 5.

135. RAMPOLDI. Un nuovo caso di transitorio mecanica infiltrazione linfatica nella cornea. *Ann. di ottalm.*, vol. xiii., 1,p. 70.

136. MASSON, A. Étude sur l'astigmatisme cornéen et la perception des couleurs chez les opérés de cataracte. *Thèse de Lyon*, 1883.

MEYHÖFER (127) found that the results of a simple medicamentous treatment of corneal ulcers are very poor. Neither did the treatment of serpent ulcer with iodoform alone succeed well; but the results were much more favorable when it was dusted upon an ulcer previously scraped out with a sharp spoon. When this method also failed, Saemisch's operation had to be resorted to.

KUHNT (130) publishes a series of cases in which he succeeded in healing torpid corneal ulcers by covering them with a conjunctival flap.

NIEDEN (131) observed neuro-paralytic keratitis of the left eye in paralysis of the fifth and sixth nerves after injury of the motor zone of the parietal lobe, and a similar case after fracture of the base of the skull.

PROUFF (132) is satisfied, from investigations extending over several years, that congenital regular astigmatism is always accompanied by abnormal curvature of the cornea.

ANGELUCCI (133) describes at greater length his ophthalmometric measurements in keratoconus and corneal ectasia, made and published one and a half years ago. The vision of six patients was somewhat more improved with conical lenses (rounded off at the apex) than with spherical and cylindrical glasses.

DANTONE.

DE WECKER and MASSELON (134) have constructed an apparatus for measuring and estimating in dioptries the deviation of curvature in keratoconus, which, by comparison of central and peripherical reflex images, serves to determine the curvature of the cornea. v. MITTELSTÄDT.

RAMPOLDI (135) observed another case of saturation of the cornea with lymph when the head was bent forward. The patient was an ill-fed, anæmic boy of twelve, suffering from iridocyclitis, in whom the phenomenon could be easily produced. When the head was held upright again, the cornea cleared up in less time than it required to become opaque. DANTONE.

MASSON (136) discusses corneal astigmatism after cataract-extraction; in the first weeks it amounts to about 4 D, gradually diminishes to 1–3 D, and may even entirely disappear. It cannot be entirely corrected with cylindrical glasses, which should not be prescribed before complete cicatrization—*i. e.*, the end of two months. Masson observed that patients operated for cataract could not distinguish colors without a correcting glass; called light shades of yellow pale green, and pink violet, and corrected their mistake only when provided with the proper glass.

v. MITTELSTÄDT.

XII.—IRIS.

BY DR. NIEDEN.

137. v. HASNER. Operative removal of persistent pupillary membrane by corelysis, and presentation of the patient at the meeting of German physicians. *Prager med. Wochenschr.*, No. 47, p. 457.

138. REYNOLDS, D. S. Cystoid cicatrix. *N. Y. Med. Herald*, Jan., 1884.

139. SCHELL, H. S. Case of tubercle of the iris. *Trans. Amer. Ophth. Soc.*, 1883.

140. WADSWORTH, D. F. Case of tuberculosis of the ciliary body and iris. *Trans. Amer. Ophth. Soc.*, 1883.

SCHELL'S (139) patient was a boy nine years of age, who when first seen was suffering from what seemed to be plastic iritis. Three months later a small yellowish-white nodule the size of a pin-head was seen projecting from the nasal side of the pupil, which gradually increased in size, and finally had a few blood-vessels running over its surface. The eye was enucleated, and on examination there were found two or three tubercular masses embedded in a mass of organized inflammatory product, which nearly filled the anterior and posterior chambers. The child was under treatment for coxalgia. BURNETT.

WADSWORTH'S (140) patient was a girl eight and a half years old, who showed a yellowish reflex from the pupil of the left eye; the cornea was hazy, pupil moderately dilated, and there was some ciliary congestion. In a month there was a staphyloma in the upper ciliary region of 5''' by 3'''; no trace of iris to be seen; anterior chamber nearly filled with a growth. The eye was enucleated, and on examination the growth from the ciliary region was found to contain granulation-tissue, giant-cells, and the bacillus of Koch. The child died five months afterward from tubercular meningitis. BURNETT.

v. HASNER (137) operated a case of persistent pupillary membrane in a person twenty-three years old. It was easily detached from the capsule, while the threads inserting themselves to the anterior surface of the iris were torn without difficulty, so that the membrane could be entirely removed. V increased 50 %. A microscopic examination has not yet been made.

REYNOLDS (138) reports another case of cystoid cicatrix treated according to the method described by himself and published in the *Trans. Amer. Ophth. Assoc.*, 1879. He makes an incision along the sclero-corneal juncture from $\frac{1}{8}''$ above to $\frac{1}{8}''$ below. The iris is cut loose from its attachment to the cornea, and the cicatricial mass cut away with scissors. A curved cornea-needle armed with sewing-silk is then passed through the edge of the cornea and through the corresponding point of the sclera; the suture is then drawn through and tied. Another similar suture is

then inserted in the lower half of the elliptical opening. The eye then presents the appearance of having been subjected to an ordinary iridectomy. BURNETT.

XIII.—CHOROID.

141. BIRNBACHER, A. On pigmentation of melanotic sarcomata. *C. f. A.*, vol. viii., p. 38.

142. BRAILEY. Tubercle of the eye. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 129.

143. MASSELON. Des infiltrations vitreuses de la rétine et du nerf optique. *Soc. franç. d'ophth.*, Jan. 28, 1884.

144. MULES. Panophthalmitis. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 55.

145. WARNER. Tubercle in choroid. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., pp. 126 and 813.

BIRNBACHER (141) tries to prove that all the pigment in the case of epibulbar melano-sarcoma, described in the November number of the *C. f. A.*, was of hematogenous origin, microscopic examination showing that it could not have been derived from the choroid or from the embryonic condition.

BRAILEY (142) reports the case of a child two years old, in whom there was rapid enlargement of the right eyeball, deep anterior chamber, posterior synechiæ, medium-sized clear pupil. The ophthalmoscope showed the retina apparently detached. The eye was excised, and examination proved the existence of the detachment, which was bulged forward by an abundant, clear, yellowish liquid. Projecting from the region of the papilla, and immediately surrounding the choroid was a mass the size of a large pea. A few isolated patches of a similar nature were found in the adjacent sclera. Histologically this appeared to be a tuberculous mass. FITZGERALD.

WARNER (145) recognized tubercles of the choroid by the ophthalmoscope in a child nine years old. There was no optic neuritis. In the right eye the disc was reddish. There was general miliary tuberculosis, but no meningitis. FITZGERALD.

MASSELON (143) reports on the colloid excrescences arising from the lamina vitrea of the choroid and extending into the vitreous, which clinically have been studied very little thus far; they occur mainly in the neighborhood of the disc. When seen with the opthalmoscope they appear as whitish dots of about the diameter

of a thick retinal blood-vessel. (These excrescences have long been known in German literature.—N.) MARCKWORT.

MULES (144) saw glaucoma supervene on myopia in both eyes in a young man twenty-two years old. Iridectomy was performed, which left a cystoid cicatrix in the right eye. Two years and a quarter later the right eye became inflamed suddenly, and in twenty-four hours was lost from panophthalmitis. Mules can only conclude that the case was one of purulent absorption through the cystoid cicatrix. FITZGERALD.

XIV.—GLAUCOMA.

146. PFLÜGER. Cases of hemorrhagic glaucoma. *Report of the Ophthalmic Clinic of the University of Berne for the Year 1882.* Berne : J. Dalp, 1884, 79 pp.

PFLÜGER (146) reports a case of hemorrhagic glaucoma in a woman whose left eye had become totally blind from melanosarcoma of the choroid. After vainly endeavoring to check the attacks with pilocarpine and eserine, she was finally cured by enucleating the blind eye and performing iridectomy in the other.

XV.—SYMPATHETIC OPHTHALMIA.

147. ABADIE. Quelques considérations pratiques sur l' ophthalmie sympathique. *Arch. d' ophth.*, 1884, vol. iv., No. 2.

148. BOWMAN, W. Recovery from severe sympathetic ophthalmia. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 69.

149. DOLSCHENKO, B. Two rare cases of sympathetic ophthalmia. *Wjest. Ophth.*, vol. ii., pp. 148–160.

150. FRÄNKEL. Remarks on the pathogeny of sympathetic ophthalmia. *C. f. A.*, vol. viii., p. 43.

151. FROST, W. A. Sympathetic ophthalmia. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 73.

152. FUCHS, E. Sympathetic paralysis of accommodation. *Zehender's klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 23.

153. SNELL. Sympathetic ophthalmia. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 75.

154. SPALDING, J. A. Case of sympathetic neuroretinitis. *Trans. Amer. Ophth. Soc.*, 1883.

155. WALKER, G. E. Sympathetic ophthalmia. *Brit. Med. Jour.*, No. 10, 1883, p. 923.

DOLSCHENKO (149) reports two cases of sympathetic ophthalmia.

First case: Left eye blind for ten years, was injured by a twig. Iridocyclitis. Five months later impairment of V in the right eye, moderate lachrymation, photophobia, and sluggish reaction of the pupil; no redness. The ophthalmoscope showed reddish-yellow chorio-retinal spots. Enucleation of the left eye. On opening it a small splinter of wood was found near the ora serrata. Second case: Received a blow with the fist on the right eye ten years ago; immediate loss of V; eye gradually became phthisical. Since then pain and redness at times in the right eye, and lachrymation and photophabia in the left. Last year, after a cold, inflammation in the atrophic and impairment of V, photophobia, photopsia, and lachrymation of the left eye, ***but no redness.*** In the left $M = \frac{1}{6}$. Fingers counted with correcting glass at only four feet. With the ophthalmoscope: posterior staphyloma, no changes at the macula lutea, a number of white and pigmented spots in the retina and choroid. Enucleation of the right eye. The choroid was found completely detached, ossified, and pressing the retina, which had been torn from the optic nerve, against the calcareous lens.

HIRSCHMANN.

FRÄNKEL (150) reports a case of sympathetic ophthalmia, which took the form of papillitis without any subjective symptoms and without impairing vision. The clinical history, however, is too brief to establish the sympathetic nature of the affection.

In the case observed by SPALDING (154), the right eye in a woman fifty-six years of age, with no history of syphilis, was destroyed by a blow from the horn of a cow. In five weeks the left began to fail, and in the course of several weeks became blind. When it was recovering its vision it was seen by Spalding, who found a typical neuroretinitis, but evidence of no other disease past or present. On enucleation of the lost eye V gradually returned to $\frac{20}{20}$.

BURNETT.

FUCHS (152) reports a case of paralysis of accommodation, which developed eight days after the severely injured left eye had been enucleated, without any symptoms of irritation and unchanged refraction (emmetropia). Twelve cases of cure among fourteen are reported, in which the sympathetic inflammation did not develop until after the enucleation. (The sympathetic nature of the affection is not entirely beyond doubt.)

In view of the doubts occasionally expressed as to the efficacy and advisability of enucleation before or at the outbreak of a sympathetic affection, ABADIE (147) maintains the absolute neces-

sity of *immediately removing* an eye with practically useless vision. Report of three cases, benefited by treatment. In one case the cause of sympathetic ophthalmia was the wearing of an artificial eye on a stump left after Critchett's operation for staphyloma; in another, incarceration of the iris after cataract-extraction. In the third case the sympathetic iridocyclitis began eight years after an injury, was cured completely by enucleation, returned three years later, and was cured again, after exenteration of the orbit on account of tenderness to pressure in its depth. v. MITTELSTÄDT.

BOWMAN (148) reports a remarkable case of recovery after long-continued treatment. The exciting eye was removed.

FITZGERALD.

FROST (151) records a case in which the exciting was not removed, but there was a good result in the sympathizing eye, though the pupil had numerous tough adhesions, and the margins of the disc were blurred; $V = \frac{20}{30}$. FITZGERALD.

In SNELL'S (153) case the symptoms subsided on freeing an incarcerated portion of iris in the exciting eye. FITZGERALD.

WALKER (155) strongly advocates mercurial inunctions in sympathetic ophthalmia. The oleate of mercury is the preparation he appears to use. FITZGERALD.

XVI.—LENS.

156. DUJARDIN. Luxation traumatique du cristallin; extraction. *Journ. des sci. méd. de Lille*, 1883, No. 23.

157. KAZAUROW. Report on a first hundred of cataract-extractions. *Wjestnik Ophth.*, 1884, vol. i., pp. 23–39.

158. FIEUZAL. Cataracte hémorrhagique. *Soc. franç. d'ophth.*, Jan. 31, 1884.

159. DA GAMA PINTO. Des hémorrhagies consécutives à l'extraction de la cataracte. *Rev. gén. d'ophth.*, vol. iii., 3, 1884.

160. GAYET. De la perception des rayons ultra-violets par les opérés de cataracte. *Soc. franç. d'ophth.* Jan. 31, 1884.

161. KNAPP, H. Report of the eighth series of one hundred consecutive cataract-extractions. These ARCH., vol. xii., 1, p. 269.

162. QUAGLINO. Regli antisettici nella cura consecutiva all' estrazione della cataratta. *Gazz. d'ospitali*, No. 17.

163. SZILI, A. Spontaneous absorption of a cataractous lens. *C. f. A.*, vol. viii., p. 17.

164. THEOBALD, S. Two cases in which trituration of the

cortex was practised in connection with preliminary iridectomy to hasten the development of slowly ripening cataract. *Trans. Amer. Ophth. Soc.*, 1883.

165. WALKER, L. P. Statistical report of sixty-three cataract-extractions performed at the N. Y. Eye and Ear Infirmary during the year ending September 30, 1883. *Sixty-third Annual Report of the Institution*, 1883.

166. WEBSTER, D. Report of thirty-five cases of cataract-extraction. *Trans. Amer. Ophth. Soc.*, 1883.

SZILI (163) saw spontaneous rupture of the capsule of a ripe, swollen cataract, followed under glaucomatous symptoms by gradual absorption, so that finally good vision was obtained.

DUJARDIN (156) extracted a lens which twelve years ago had been dislocated into the vitreous, on account of iridocyclitis, after he had brought it into the interior chamber through the dilated pupil. Recovery. V. MITTELSTÄDT.

Among one hundred extractions (fourteen of them complicated cataract) KAZAUROW (157) had two cases of purulent keratitis and panophthalmitis (once in an unripe cataract); in three cases, occlusion of the pupil, with $V = \frac{1}{\infty}$ (twice in hypermature and once in unripe cataract); secondary cataract necessitating another operation in thirteen cases; once delirium nervosum. The author confirms the hastening influence of iridectomy on the ripening of the cataract. He made a linear section according to Graefe. He advocates strict antiseptic precautions, a sublimate solution 1:1000, when it does not irritate, or a 4-% solution of boracic acid for irrigation before and after the operation. The instruments are washed in alcohol. A film of iodoform is spread over the wound. Bandaged with hygroscopic cotton. $V > \frac{1}{10}$ in 78 cases, $V < \frac{1}{10}$ in 17, $V = \frac{1}{\infty}$ in 3, $V = 0$ in 2. HIRSCHMANN.

KNAPP (161) reports an eighth hundred of cataract-extractions, and has tabulated them in such a manner that their course and result can be easily followed. The section was made at the sclero-corneal margin; iridectomy was made smaller than formerly, the capsule opened at the periphery, the lens removed by pressure, and the wound cleansed very carefully so as to insure healing by first intention. Antiseptics were used in every other case. The results are very good: 90 % excellent results, 8 % moderate, and 2 failures. The cases are also arranged with a view to the age of the patients, their general health, and the nature of the cataract. There was no difference in the results obtained under

antiseptic precautions and without them. Secondary operations in 38 cases, all with good results.

Of the 63 extractions reported by WALKER (165), 58 were according to Graefe, 2 according to Beer, 2 peripheral, and 1 linear. Of these 37 had good V, 7 useful V, 10 perception of light, 4 no p. l. The other 5 are not noted for various reasons.

BURNETT.

WEBSTER (166) reports 35 extractions. The method was that of Graefe, and the results were as follows: In 2 V = $\frac{20}{30}$; in 3 = $\frac{20}{40}$; in 6 = $\frac{20}{50}$; in 8 = $\frac{20}{70}$; in 3 = $\frac{20}{100}$; in 4 = $\frac{20}{200}$; in 1 = $\frac{20}{\text{fingers}}$; in 1 = $\frac{4}{200}$; in 1 = $\frac{2}{\text{fingers}}$; in 1 = p. l.; in 5 = 0.

BURNETT.

FIEUZAL (158) discusses a case of cataract, in which, immediately after the iridectomy, there was a hemorrhage, followed by the escape of the lens and vitreous. He was obliged to enucleate the eye on account of consecutive panophthalmitis. The other eye had been operated two weeks before without any accident or unfortunate result. DIANOUX saw a similar case. ABADIE agrees with WARLOMONT (*cfr. Ann. d'ocul.*, Jul.-Aug., 1883, and *Arch. f. Augenheilk.*, vol. xii., Rev. No. 967) in saying that, after observing such an accident in the first eye, the second should only be operated after previously injecting ergotine at the temple, and continuous compression of the carotid during the operation and for the preceding twenty-four hours.

MARCKWORT.

DA GAMA PINTO (159) reports, from the Heidelberg clinic, two cases of severe intra-ocular hemorrhage causing the loss of the eye, and reviews similar cases. In both cases the tension was normal, and the urine free from albumen and sugar. The extraction was performed under anæsthesia, and the hemorrhages took place several hours later, immediately after vomiting.

v. MITTELSTÄDT.

QUAGLINO (162) thinks that the failures in cataract-operations cannot be ascribed, in most cases, to parasitic causes, and therefore places but little faith in the efficacy of antiseptics.

DANTONE.

In both cases operated by THEOBALD (164), the lenses became perceptibly more opaque within a few days after the operation.

BURNETT.

GAYET and CHARDONNET (160) experimented on patients operated for cataract, with a view of determining their power to

perceive the ultra-violet rays. The patients were able to do so, while Gayet and Chardonnet failed, on account of the lens still in the eye (*cfr.* Chardonnet: Vision des radiations ultra-violettes, *Compte rendu des séances de l'acad.*, No. 8, and *Arch. f. Augenheilk.*, vol. xii., p. 494). MARCKWORT.

XVII.—VITREOUS.

167. NETTLESHIP. Ophthalmitis simulating glioma in children. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 36.

NETTLESHIP (167) considers that these cases demand closer attention, especially in reference to their morbid anatomy and their clinical and pathological relationships. He indicates some of the leading points of difference between these cases and those of true glioma, and he reports twenty-seven cases from his own practice and other sources, and concludes with an analysis of the series. FITZGERALD.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

168. ADAMS. Changes in macula. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 113.

169. ARMAIGNAC. Note sur un cas de guérison spontanée de décollement ancien de la rétine, mais sans retour de la vision. *Rev. clin. d'ocul.*, 1884, No. 2.

170. BERNARD, D. Un cas de suppression brusque et isolée de la vision mentale des signes et des objèts (forme et couleur). Confér. de M. le Prof. Charcot à la Salpêtrière. *Progr. méd.*, Jul. 21, 1883.

171. CHIBRET. Un cas extraordinaire de l'héméralopie congénitale. *Arch. d'ophth.*, 1884, vol. xiv., No. 1.

172. DARIEZ. Diagnostic de l'amblyopie par l'exploration électrique du nerf optique. *Soc. franç. d'ophth.*, Jan., 29, 1884.

173. DENTI. Sulla retinite pigmentosa. *Gazz. med. Lomb.*, Nos. 12-15, Mar., 1884.

174. DUFOUR. Sur le champ visuel des hémianopsiques. *Soc. franç. d'ophth.*, Jan. 29, 1884.

175. DUJARDIN. Un cas d'amaurose intermittente. *Journ. de sci. méd. de Lille*, 1883, No. 23.

176. FANO. Décollement de la rétine guéri par une opération d'iridectomie. *Journ. d'ocul. et de chir.*, 1883, No. 130, p. 112.

177. FONTAN. Diagnostic positif de l'héméralopie. *Soc. franç. d'ophh.*, Jan. 30, 1884.

178. GALEZOWSKI. Des differentes variétés de décollement rétinien et de leur traitement. *Rev. d'ophth.*, Jan., 1884, and *Soc. franç. d'ophth.*, and *Rec. d'ophth.*, Feb., 1884.

179. GILLET DE GRANDMONT. De l'action des courants électriques appliqués au voisinage du cerveau et des résultates qu'ils produisent en particulier dans l'œil. A. Coccoz, Paris, 1883.

180. GUELLIOT. De l'amaurose nicotinique (mémoire couronné par la société contre l'abus du tabac). *Gaz. d'ophth.*, 1883, p. 136.

181. GUNN. Peculiar appearance in retina near optic disc. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 110.

182. HORROCKS. Facial and ocular nævus. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 106.

183. RAMPOLDI. Polso spontaneo della arterie retiniche in alcuni casi di cateratta corticale incipiente. *Gazz. med. Lomb.*, 1884, No 10.

184. SCHÖLER. Report of cases of lateral and temporal hemianopsia. Contribution to the pathology of the optic nerve and retina in constitutional diseases. Berlin, Peters, 1884, p. 60.

185. STORY and BENSON. Aneurysma on retinal vessels. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 105.

186. WILBRANDT, H. Ophthalmiatric contributions to the diagnosis of cerebral affections. Wiesbaden, 1884, J. F. Bergmann.

ADAMS (168). The peculiar changes are shown in two drawings, and are apparently greater in the left eye, in which V was reduced. FITZGERALD.

GUNN'S (181) patient was a girl, æt. sixteen. In the right the ophthalmoscope showed very minute, yellowish-white shining dots in the retina for some distance around the disc, especially to the nasal side and below. Outline of disc rather indistinct. Large veins full and somewhat tortuous. Left eye the same. Refraction H. The right eye in patient's mother showed similar minute spots, more in left ; also H. There were eight children, including the patient, and all of those examined (five) presented the same appearance in their retinæ. The refraction in four is noted as H. Gunn says he has since examined a large number of patients, with

reference to this peculiar appearance, and that he has found it present in four additional cases. FITZGERALD.

HORROCKS' (182) patient, æt. nine, had been subject to fits of an epileptic nature since birth, which cause clonic spasms on left side of trunk and limbs. Hemiplegia of left side. Right side of the face, including the skin of the eyelids, and forehead is covered with a nævus which does not cross the median line. Net-work of blood-vessels in the conjunctiva on each side of the cornea in right eye. Left eye quite normal. The retinal blood-vessels in the right eye were exceedingly tortuous, but in the left normal. Horrocks suggests that possibly vessels supplying the pia mater on the right side may be similarly affected, and that this may have something to do with the fits. FITZGERALD.

STORY and BENSON (185) report and give a plate of a case of aneurysmal swellings in the retinal arteries in a peculiar case of retinitis. FITZGERALD.

DENTI (173) discusses at length the prevailing views on retinitis pigmentosa and tries to establish a connection between it and the physiological movement of the pigment epithelium along the rods and cones discovered by Bull. DANTONE.

RAMPOLDI (183) saw spontaneous pulsation of the central retinal artery in four persons affected with beginning cortical cataract. He explains the phenomenon by assuming an increase of the intra-ocular pressure produced by the swelling of the lens. In two of the patients the refraction had also changed, so that they could read again without the aid of glasses. DANTONE.

ARMAIGNAC (169) reports a case of extensive detachment of the retina in a slightly myopic eye. The diagnosis was confirmed by others. The patient did not undergo any treatment. Three years later, when he appeared again, not a trace of the detachment could be discovered. There was now, however, atrophy of the optic nerve and amaurosis. v. MITTELSTÄDT.

FANO (176) saw a recovery from detachment of the retina after an iridectomy. Three months later the retina was still in position. v. MITTELSTÄDT.

GALEZOWSKI (178) discusses the prodromi of detachment of the retina. Among these the sensation of a veil drawn across the field of vision, shadows and clouds moving up and down, are characteristic of myopic eyes, as well as sensations of light and color. Among 647 patients there were 236 women; the occupation of men predisposes them more to detachment. Next to myopia

injuries may be cited as the cause (sixty-one cases), also albuminuria, diabetes, and erysipelas; it may sometimes even be of sympathetic origin. v. MITTELSTÄDT.

The causes of detachment of the retina are various. Syphilis, arthritis, injuries, etc., so that all cases cannot be treated in the same manner. Horizontal position and rest in bed are of the greatest importance, and should be kept up at first day and night, and afterwards 12–18 hours daily. If the patients are suffering from syphilis or any other disease, they should be treated accordingly. MARCKWORT.

BERNARD (170) reports a case of mental blindness (Seelenblindheit) which suddenly developed in a man as the result of great excitement. The patient remained mentally very active, as his memory of hearing replaced the defect in vision.

v. MITTELSTÄDT.

DARIEZ (172) and his teacher Abadie think that from the varying electrical sensibility they can diagnosticate affections of the optic nerve when they cannot yet be recognized with the ophthalmoscope. A normal eye has a sensation of light, when a current of o—$\frac{1}{10}$ milli-Ampères passing through it is interrupted. In cases of atrophy with a bad prognosis the current must have a strength of o. 5—10 milli-Ampères to produce a sensation of light. In toxic and congenital amblyopia the electric irritability is normal. Monoyer and v. Wecker think this method is too unreliable for diagnostic purposes on account of the numerous sources of error.

MARCKWORT.

GILLET DE GRANDMONT (179) recommends the constant current in cases in which it is desirable to stimulate the intra-ocular circulation, increase the sensibility of the retina, and alter the secretion; it should therefore be employed in chronic irido-choroiditis, beginning atrophy of the optic nerve, glaucoma, and hyalitis.

v. MITTELSTÄDT.

In regard to the differential diagnosis between tobacco- and alcohol-amblyopia, GUELLIOT (180) states that the former at first only affects one eye, that there is hemeralopia and good color-perception. v. MITTELSTÄDT.

SCHÖLER (184) reports fourteen cases of hemianopsia, twelve of homonymous lateral and two of temporal hemianopsia. Of the latter one is probably due to a brain-tumor, the other the result of a fracture of the base of the skull. (If the author thinks that similar cases have thus far not been reported, his attention may

be called to those published by the Reviewer in the *Arch. f. Augenhk.*, vol. xii., pp. 30 and 39.)

WILBRANDT (186) seeks to localize a lesion in the gray substance of the visual centre from the symptoms of lateral hemianopsia, and has investigated the literature of the subject for this purpose. He also adds the report of a case of right-sided lateral hemianopsia, with disturbances of sensibility, in a young woman in childbed.

XIX.—OPTIC NERVE.

187. HIRSCHBERG, J. On embolism of the central retinal artery. *Centralbl. f. Augenhk.*, vol. viii., p. 14.

188. MAGNUS, H. Report of cases of congenital malformations of the optic nerve. *Zehender's klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 85. With an illustration.

189. UHTHOFF. On atrophy of the optic nerve. Berl. Ges. f. Psych. u. Nervenkrankh., Sitzung v., 14th Jan., 1884, and Beiträge zur Pathologie des Sehnerven u. d. Retina bei Allgemeinerkrankungen. Berlin: Peters, 1884, p. 1.

MAGNUS (188) saw, after removing the cataract, the optic disc of the right eye reduced to a small whitish crescent (oblique position, REV.), whose inner edge was bordered by brown pigment, in a boy descended from a father with congenital cataract, and three of whose five brothers and sisters were similarly affected. The retinal blood-vessels emerged from the temporal, deeply depressed portion of the disc. There was at the same time nystagmus and a high degree of amblyopia.

HIRSCHBERG (187) reports two cases of embolism of the central retinal artery showing the peculiar and rare (only four cases thus far) phenomenon of motion in the column of blood. It took place in the arteries both in a centrifugal as well as centripetal direction, and was arhythmic. In the first case, which ended in amaurosis and came to an autopsy, the phenomenon suddenly disappeared on the fourth day; in the second, in which sight was partially restored, also on the fourth day. In the first case there was insufficiency and stenosis of the semilunar valve of the aorta; in the second, insufficiency of the semilunar valve, with dilatation of the left and hypertrophy of the right ventricle in both cases. Mauthner's massage did not seem to exercise any directly beneficial influence in the second case, though indirectly it did so.

UHTHOFF (189) examined 134 or 183 resp. cases of atrophy of

the optic nerve, and found 30 % or 37 % resp. of spinal origin, 24 % or 25 % resp. of cerebral origin, 5 % of genuine progressive atrophy, 6 % due to neuritis, 3 % with hereditary predisposition, 3 % due to orbital affections, 4.2 % or 5 % resp. due to dementia paralytica, and the remainder ascribable to the abuse of alcohol and tobacco, loss of blood, etc. Neither the medial nor temporal side of the defect in the field of vision was found to be characteristic of atrophy. In five of the cases of spinal origin there was at the same time paralysis of some ocular muscle or muscles. He also adds the report of a case of temporal hemianopsia of both eyes, due to fracture of the base of the skull and injury of the chiasma.

XX.—INJURIES AND FOREIGN BODIES (PARASITES).

190. ADAMS. Foreign body near macula. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 115.

191. FANO. Corps étranger ayant pénétré dans la chambre antérieure, éliminé spontanément par une perforation de la cornée au bout de sept semaines. *Jour. d'ocul. et de chir.*, 1883, p. 101. Cases.

192. FRANKE, E. On some cases of injury to the eye. *Berl. klin. Wochenschr.*, 1884, No. 5.

193. HOFMANN, FRANZ, Prof. On traumatic conjunctivitis in miners. *Arch. f. Hygiene*, vol. i., pp. 40–48.

194. HOLT, E. E. Commotio retinæ; or some of the effects of direct and indirect blows to the eye. *Trans. Amer. Ophth. Soc.*, 1883.

195. ISSIGONIS (Smyrna). Extraction of a piece of gun-cap of considerable size from the vitreous. *C. f. A.*, vol. viii., p. 80.

196. DE LAPERSONNE and VASSAUX. Clinique ophthalmologique de la Faculté. Des altérations pigmentaires de la rétine consécutives à une traumatisme de l'œil. *Arch. d'ophth.*, vol. iv., No. 1.

197. MANZ, W. Two cases of cysticercus cellulosæ. *Arch. f. Augenhk.*, vol. xiii., p. 198.

198. SNELL, SIMON. The magnet and electro-magnet in ophthalmic surgery, and removal of a piece of steel from the vitreous by the electro-magnet. *British Med. Jour.*, 1883, Nos. 10 and 17, pp. 923 and 959.

ADAMS (190) observed a case in November, 1881, in which a small triangular chip of steel flew off an anvil and penetrated the

patient's eye about 7 *mm.* from the corneal margin, and then lodged in the retina near the macula. V for some hours after the injury was reduced to doubtful p. l., but gradually improved till in May, 1883, V = $\frac{20}{30}$ and J. 1. A plate illustrates the appearance in the fundus. FITZGERALD.

FANO (191) saw a foreign body, which had entered the anterior chamber, spontaneously eliminated through the cornea after remaining in for seven weeks.

FRANKE (192) reports a case of injury to the right eye by the thrust of a steel pen, producing division of the anterior capsule and cortical cataract. The opening in the capsule closed again, the opaque lens was absorbed, and patient was discharged with V = $\frac{1}{6}$ with + 2.75 D.

HOFMANN (193) saw a peculiar form of conjunctivitis in miners who were engaged in damming up quicksand in a shaft. It was produced by the entrance of very minute grains of sand into the conjunctival sac. Glasses and other protective appliances failed to keep it out, until finally the difficulty was overcome by wearing a broad-brimmed hat.

ISSIGONIS (195) succeeded in extracting a piece of gun-cap, 4 *mm.* long and 1.25 *mm.* wide, from the vitreous, under antiseptic precautions.

SNELL (198) extracted a piece of steel from the vitreous three weeks after the accident, through an incision in the sclerotic. Twelve days afterward the eye was quiet and V = $\frac{20}{40}$. The fragment weighed 0.0046 of a grain. FITZGERALD.

HOLT (194) reports four cases in which great diminution or loss of vision occurred after blows on the eye, where no changes were observed in any part except in the retina, which was hazy, and in one instance there was a slight tortuosity of the veins. V was restored in a short time in all, though in one there was a relapse with ultimate restoration. BURNETT.

DE LAPERSONNE and VASSAUX (196) enucleated an eye which had become blind twenty-five years ago immediately after being injured by gunshot, on account of sympathetic neuritis. A shot had entered at the upper outer margin of the cornea, had passed through the zonula and vitreous, without touching the lens, and had penetrated the sclera outward from the papilla. The retina showed the typical picture of retinitis pigmentosa. There was marked atrophy of all the layers of the retina except of the layer of ganglion cells and of the connective tissue, which, like the

interfibrillar connective tissue of the optic nerve, had become hypertrophic ; proliferation of the pigment, which at some points penetrates into the vitreous, but mainly follows the course of the blood-vessels and enters their walls, increased to four times their usual thickness. Some of the small blood-vessels had been obliterated, but some new ones also had been formed. The authors think that the optic nerve was probably injured, as the changes in the retina agree in all respects with those seen in animals after dividing the optic nerve, and with those observed in a case of Pagenstecher after injury of the optic nerve.—*Arch. d'ophth.*, vol. iv. No. 1. v. MITTELSTÄDT.

MANZ (197) reports two cases of cysticercus cellulosæ, a rare affection, in Southern Germany. One was subconjunctival, the other subretinal, and both were successfully removed.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

199. CONTI. Considerazioni sopra un caso di esoftalmia cachettica. *Gazz. de ospit.*, Nos. 26 and 27.

200. BURNETT, C. H., and OLIVER, CHAS. A. Case of recurrent dropsy of the left middle ear complicated, after eight years duration, by an acute attack of monocular optic neuritis (choked disc) on the same side, followed by general tabetic symptoms.

201. DEHENNE, A. Influence de l'état général sur les mauvais résultats de certaines opérations de cataracte. *Soc. franç. d'ophth.*, Jan. 31, 1884.

202. DIMMER (Jäger's clinic). Case of affection of the eye after recurrent fever. *Wiener med. Wochenschr.*, 1884, No. 12, p. 336.

203. DOR. Deux cas d'affections oculaires dépendant des troubles de la menstruation. *Soc. franç. d'ophth.*, Jan. 31, 1884.

204. FERRIER, F. Remarques cliniques sur un cas d'ophthalmie dans le cours d'un rhumatisme articulaire aigu. *Arch. d'ophth.*, vol. iv., No. 1, 1884.

205. HANSELL. The fundus of the eye in epilepsy. *The Polyclinic*, Nov. 1883.

206. JOLY. Amnésie et cécité verbale. *Le Scalpel*, 1883, No. 24, p. 147.

207. LITTLE, W. P. Eye-symptoms and conditions in Bright's disease. *Med. News*, Jan. 26, 1884.

208. MACKENZIE, ST. Chronic tubercle of choroid and brain. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 119.

209. MAREN, E. Contributions to the knowledge of tuberculosis of the eye. *Inaug. Diss.*, Strassburg. Berlin, 1884, 50 pp.

210. MASSALOUX LAMONERIE. Des manifestations de la syph. héréditaire tardive. *Thèse de Paris*, 1884.

211. SCHLESINGER, J. Contribution to the knowledge of the relation of the pathology of the retina to Bright's disease. *Inaug. Diss.*, Berlin, 1884, and Schöler, Beiträge z. Path d. Sehnerven u. d. Netzhaut bei Allgemeinerkrankungen, Berlin, 1884, Peters, pp. 51.

212. TERSON. Sur la rétinite albuminurique. *Rev. d'ocul. du sud-ouest*, No. 10, 1883.

MACKENZIE (208) observed tuberculosis of the choroid in a child æt. four. The post-mortem confirmed the diagnosis.

FITZGERALD.

MAREN (209) has compiled a number of cases of tuberculosis observed at Laqueur's and Hirschberg's clinic, based on which he discusses tuberculosis of the eye. In twelve cases the conjunctiva was affected, in seven the iris, in four the choroid, in one the retina, and in one the optic nerve; once there was tuberculosis of the brain combined with choked disc in both eyes and amaurosis.

HANSELL (205) had the opportunity of examining the fundus of an epileptic during a fit, and found no deviation from the normal.

BURNETT.

JOLY (206) observed a man æt. sixty-two, who had lost speech ten years ago after an attack of apoplexy. He conversed with those around him by gestures, and understood them well. It was impossible for him to read or write any thing except Arabian numbers, and his own name he could write with great difficulty.

V. MITTLESTÄDT.

CONTI (199) describes a case of Basedow's disease, in which there was a multitude of general symptoms, difficulty of deglutition, vomiting, swelling of the liver and icterus, albuminuria, slight œdema and dark coloring of the skin, and general loss of vitality, besides the typical symptoms of the disease. The author thinks that while in general an affection of the cervical portion of the sympathetic nerve is the cause of Basedow's disease, the general symptoms in his case must be ascribed to an affection of the whole vegetative nervous system.

DANTONE.

DOR (203) reports two interesting cases of ocular affections preceding the first menstrual discharge. Hemorrhages into the

vitreous took place one day in a girl æt. fourteen, not yet menstruated, which disappeared and reappeared until the beginning of regular menstruation, when they ceased, and vision remained good. In the second case hysterical amblyopia developed with the beginning of the menses, which disappeared as soon as they became regular. Nicati observed swelling of the thyroid gland in a similar case. MARCKWORT.

SCHLESINGER (211) discusses forty-three cases of retinal affections in Bright's disease from Prof. Schöler's clinic, 67.5 per cent. males and 32.5 per cent. females. The ophthalmoscopic condition and visual disturbances were as follows: 1—hemorrhages and patches in 33 cases, 76.7 per cent.; 2—hemorrhages without patches in 6 cases, 13.9 per cent.; 3—changes extending to the periphery without amyloid degeneration of the kidneys in 3 cases, 6.9 per cent.; 4—the papilla alone affected in 3 cases, 6.9 per cent.; 5—in 2 no ophthalmoscopic change; 6—in 7 there was a retrogressive change in the retinal affection. Only once was one eye alone affected.

LITTLE (207). Among 911 cases of the disease reported by different observers, changes in the retina were noticed in twenty per cent. BURNETT.

TERSON (212) observed a case of retinitis albuminurica, in which the albumen appeared much later in the urine, and the patient died of uræmia. V. MITTELSTÄDT.

DEHENNE (201) reports a case of suppuration of the cornea after extraction of cataract in a patient suffering from cirrhosis of the liver and ascites. In one eye suppuration began three days after the extraction. In the other eye the result at first was good (V = 1); three months later, however, the patient suddenly felt a severe pain in the eye when returning home from a walk. The next day the whole cornea was infiltrated with pus, the eye painful, etc. Dehenne makes use of this case to support his belief that suppuration of the cornea after operations frequently is due, not to infection of the wound, but to the constitutional disease.

MARCKWORT.

FERRIER (204) describes the course of a rheumatic affection of the eye in a woman free from gonorrhœa, whose relatives were all predisposed to rheumatic affections. An acute inflammation of the left knee-joint was followed by a catarrhal conjunctivitis, which became very intense in the right eye when the left tibio-tarsal joint was attacked. Other joints then became affected;

superficial keratitis of both eyes, and after it had been cured exudative iritis ensued, which relapsed in the right eye with the rheumatism of the joint. The author concludes from his own observations and those of others that rheumatic affections of the eye are very rare in acute rheumatism of the joints, and that either the conjunctiva, cornea, or uveal tract may become affected, either at the same time or alternately with the affection of the joint. The prognosis is favorable. v. MITTELSTÄDT.

DIMMER (202) reports a case of affection of the eye after recurrent fever, consisting in an inflammation of the ciliary body and retina, and followed later by opacities of the vitreous.

MARCKWORT.

MISCELLANEOUS NOTES.

Drs. J. F. NOYES and GEO. E. FROTHINGHAM have been appointed consulting ophthalmologists, and Dr. LEARTUS CONNOR attending ophthalmologist, to the new Harper Hospital, Detroit, Michigan.

We are informed that some of the members of the MOORFIELDS OPHTHALMIC HOSPITAL staff in London have arranged to give short courses of instruction in Ophthalmoscopy, Refraction, and External Diseases of the Eye. The next series of these courses will begin early in May, and there will probably be another early in October.

VOL. XIV. Nos. 2 and 3.

ARCHIVES OF OPHTHALMOLOGY.

MYXO-SARCOMA OF THE OPTIC NERVE WITH HYALIN DEGENERATION.

By WALTER B. JOHNSON, M.D.,

SURGEON TO THE PATERSON EYE AND EAR INFIRMARY.

AND

T. MITCHELL PRUDDEN, M.D.,

PATHOLOGIST TO THE MANHATTAN EYE AND EAR HOSPITAL.

(*With three illustrations.*)

IF we limit the designation "primary tumors of the optic nerve" to those tumors which originate within the optic-nerve sheath, there are recorded some thirty-seven cases, of which but a small number are reported in full. A large proportion of these, although appearing in the records with a varying nomenclature, seem to belong to the *sarcomata*, and a considerable number of them have shown a marked degree of *myxomatous* degeneration, or have been distinctly *myxo*-sarcomatous in structure.

The tumor which it is the purpose of this paper to record, though closely resembling others from the same situation fully described, presents some structural features worthy of special notice.

Carrie L. A., age twelve. First examined the patient, August 14, 1883. She is a strong, healthy, well-nourished child, with a good family history. Always enjoys good health and is accustomed to hard work. Presents herself with an *exophthalmos* of the left eyeball, which protrudes 13‴, at times pressing through the palpebral fissure and appearing to be entirely without the orbital cavity. The lower eyelid constantly everted is thickened

and very much swollen, while coaptation of the lids is impossible. The conjunctiva is hypertrophied, red, and œdematous, and there is more or less continuous discharge of lachrymal secretion, containing shreds of thick *mucus*. The cornea is hazy, but not at all anæsthetic. The pupil moderately dilated responds very slightly to light. Dilatation is increased after instillation of atropine. The eyeball has considerable mobility in all directions, except downward. On palpation, a tumor is felt behind the globe, apparently occupying the entire cavity of the orbit, larger in the external and inferior quadrants. The eyeball is flattened from before backward, and is displaced upward, inward, and forward. The tumor is distinctly felt, gives the impression of being composed of numerous small bodies, about the size of peas, and has a soft, elastic feel. Pressure does not decrease the size of the tumor, and there is no pulsation or bruit.

The ophthalmoscopic examination shows a pink reflex ; retinal vessels very much diminished in size, and in the region of the macula, two or three small patches of choroidal atrophy, nearly as large as the head of a pin, direct method, with disk, very white and decreased in size.

The vision of R E = $\frac{20}{20}$. L E, no perception of light. The patient has a rapid pulse, about 120, but as no heart lesion is discovered, this is ascribed to excitement.

Previous History.—When a child six years old, her mother first noticed a prominence of the left eye, which has gradually increased until the present time. Six months after the first appearance of this enlargement, it was discovered that the eye was sightless.

The patient never had any pain or annoyance from her eye until one year ago (that is, five years after the trouble commenced), since which time she has been at times affected with a sense of fulness, and occasionally with pains about the eye and corresponding temple. These symptoms and more or less dizziness are aggravated on stooping. The patient was examined in consultation at the Manhattan Eye and Ear Hospital, and although there was some difference of opinion, the diagnosis, *orbital tumor of the optic nerve*, was made, and enucleation was advised, the majority believing the tumor malignant.

September 2, 1883.—The patient was anæsthetized and the operation commenced. The intention was to enucleate the tumor, without removing the eyeball, if possible. After the initiatory

steps had been performed, the very considerable size of the tumor compelled us to abandon the idea and proceed to enucleate the eyeball and tumor. The dissection of the conjunctiva was continued around the corneal margin. The fan-like attachments of the muscles exposed were 3''' or 4''' in breadth, and very much hypertrophied, and were easily cut without using a hook. The tumor, then exposed to view, behind a large quantity of orbital fat (which was probably the cause of the feeling of the small, pea-like bodies discovered on palpation), was solid, oblong, and almost entirely filled the orbit. For this reason it was difficult to make the dissection, and the external canthus was slit to make more room.

During the operation the nerve sheath, which was distended with fluid clear up to its junction with the globe, was punctured, and a yellowish serous fluid escaped.

The dissection was continued with the finger and the handle of a scalpel, until it was discovered that the tumor extended into the foramen of the optic nerve. Desiring to remove the entire tumor, a strong ligature was passed through it for the purpose of drawing it forward, so that, if possible, the section might be made behind it.

It seemed that the sheath, which enclosed the tumor, was attached to the optic foramen. An effort was made to cut it before severing the tumor, and then to drag the tumor forward and cut it. This was accomplished, as the surface of the tumor protruded nearly 1''' from within the sheath after its excision. The result, however, was probably a recession of the arteries, as there was a hemorrhage after the operation, which at times would be considerable, and at other times only oozing, resisting for eight hours all measures adopted for its control. The patient vomited very frequently, and each effort at vomiting caused renewed bleeding, the vomited matter, for the most part, being blood, which had passed down through the floor of the orbit. Five hours after the hemorrhage had entirely ceased, and while the nurse was sleeping, there was a second hemorrhage, which almost resulted fatally. The examination of the orbit disclosed that its floor, thin and eroded from pressure, had broken through during the operation. The optic foramen seemed to be enlarged to such an extent that the point of the index finger could be introduced. It appeared free from tumor substance, although it was thought that some portion of the tumor may have been left behind. The wound healed kindly, but slowly, without much purulent discharge, and the tissues shrunk gradually back into the orbital cavity. For a num-

ber of weeks there remained an opening into the back of the orbit, which discharged a small quantity of thick *muco-pus*. Forty-eight days after the enucleation, this opening has healed. The patient is in good health. The orbital tissues present the usual amount of shrinkage, and the disease shows no tendency to recurrence.

May 1, 1885.—The patient is now nearly fourteen years old, and has enjoyed good health since the operation, September 2, 1883. She has not been troubled by any pain in the region of the operated eye, and has worn a glass eye for about a year.

The orbital tissues are slightly more shrunken than at the last examination, and there is no tumefaction in any part of the orbital cavity, nor any thing which would appear to indicate a probability of recurrence.

The tumor was examined microscopically by Dr. Prudden whose report follows.

FIG. 1.

The tumor, after hardening in Müller's fluid and alcohol, presents the following macroscopical appearances:

It is irregularly ovoidal in shape, being somewhat flattened on one side. It is about 35 *mm.* long and about 20 *mm.* in the largest diameter. It is slightly nodular, and is completely invested by a dense, thick, connective-tissue sheath, which is continuous anteriorly with the sclerotic, and which is evidently the distended external optic-nerve sheath. This sheath is loosely attached to the tumor tissue within. From the anterior and more tapering end of the tumor, the optic nerve emerges, being somewhat narrower in diameter than normal and slightly flattened, and passing forward for about 1 *cm.* in a curved direction, enters the globe.

A longitudinal section through the middle of the tumor and the globe, presents the appearances seen in fig. 1.

Continuous with the optic nerve anteriorly, extending completely through the tumor, and lying somewhat to one side of its axis, is a longitudinally striated mass, about 8 *mm.* thick, somewhat denser than the remainder of the tumor, and for the most part sharply outlined against the rest of the tissue. This is evidently the enlarged optic nerve.

The tumor substance which surrounds the thickened optic nerve and occupies the space between it and the external sheath, is for the most part translucent, and appears to be made up of irregularly arranged masses and bands of soft tissue.

Microscopical examination of sections of this portion of the tumor surrounding the optic nerve, shows that it consists, in the main, of irregular larger and smaller masses and intricately interlacing bands of closely packed cells, separated by narrow and broad bands of dense fibrillar connective tissue, the whole moderately vascular. Into many of the cell-masses, connective-tissue fibres and fibrillæ penetrate; delicate elastic fibres are also of frequent occurrence. In some places, notably immediately around the thickened optic nerve, the fibrillar connective tissue predominates, but in most parts the cell-masses make up most of the substance. In some parts of the tumor larger and smaller islets of distinctly myxomatous tissue are present, while in others the cell-masses appear to be simply œdematous, and thus present an appearance somewhat simulating that of mucous tissue.

Scattered everywhere among the cells of the tumor, in some places sparsely, in others in great numbers, are seen sections of very irregular, larger and smaller translucent, strongly refractile bodies with rounded contours, which appear to be in connection with the cells composing the above-described cell-masses, or with the smaller blood-vessels.

These translucent bodies have the general appearance of amyloid, but they are not stained in the manner characteristic of that substance by iodine or by methyl violet. They are, on the contray, very readily stained by eosin, fuchsin,—particularly the acid fuchsin,—methyl-green, and by hematoxylin, and retain these colors very tenaciously in the

presence of strong acetic acid, alcohol, and caustic potash (30 per cent.). When unstained they are but slowly affected by strong aqua ammoniæ and 33 per cent. caustic-potash solution. They are not very readily stained by carmine. Their general appearances and the above series of reactions would indicate that the strongly refractile bodies scattered through the tumor tissue belong to the material which results from the so-called hyalin degeneration, as described by Recklinghausen.[1]

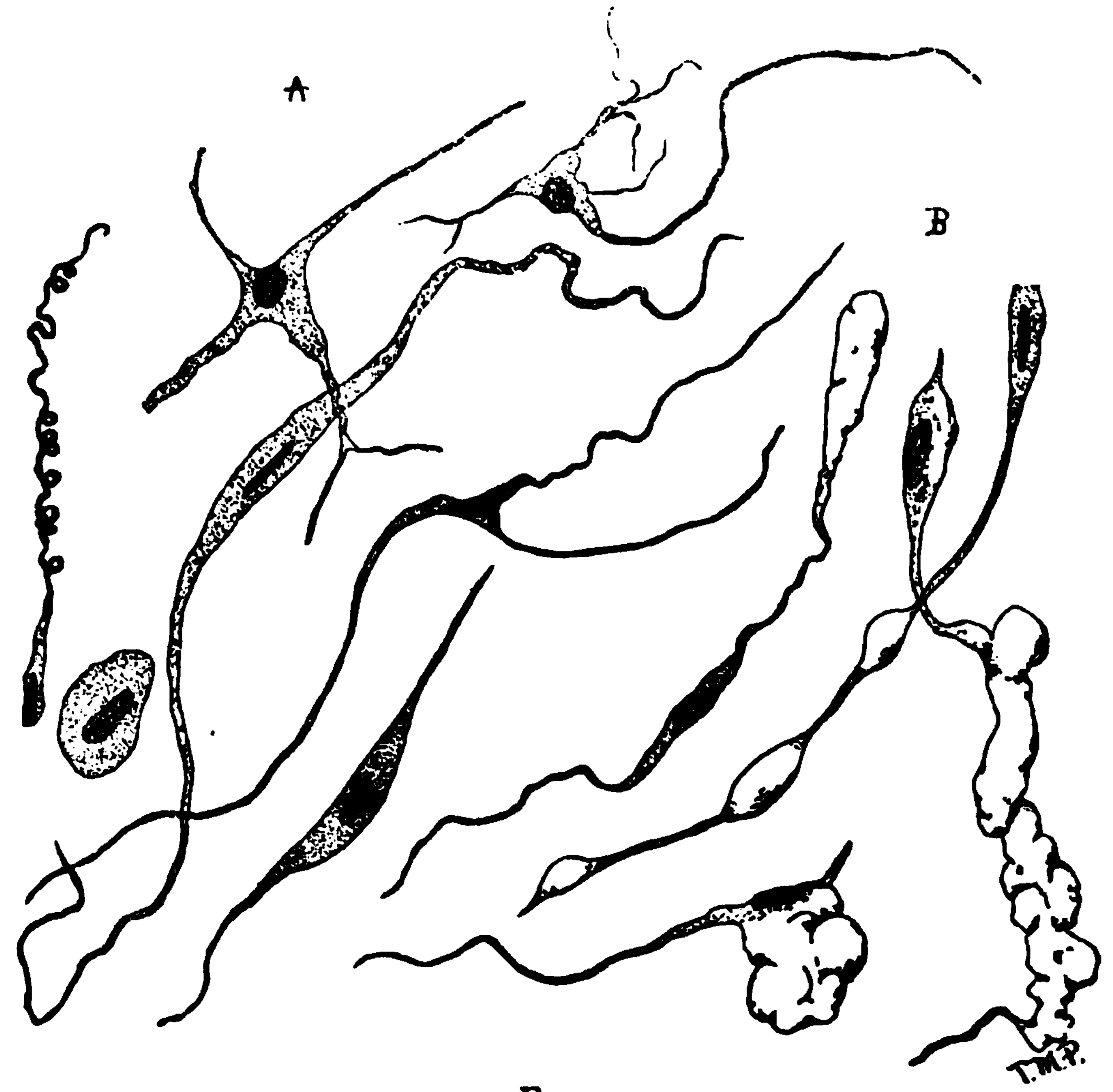


FIG. 2.

A. Cells from teased tumor. B. Degenerated cells from the same.

The shape of the cells composing the main part of the tumor, as well as the mode of origin of the above-described hyalin bodies, is best seen in bits of the tissue stained and carefully teased.

Some of the varied shapes of the cells prepared in this way are represented in fig. 2, A. The most abundant

---

[1] Recklinghausen in Billroth & Lücke's Deutsche Chirurgie, Lief. 2 and 3, page 404.

form is that of exceedingly long and slender spindles with either spheroidal or elongated nuclei. Some of these cells are so long and slender that they might readily be mistaken for simple fibres; careful scrutiny alone revealing the small nuclei. There are other fusiform cells which are broader and shorter, the bodies tapering to a point at a short distance from the nucleus. Branching cells with several processes, some long and fibre-like, others short and dividing and tapering, are quite numerous, as are also fusiform cells whose fibre-like ends are curled into close irregular spirals. Finally, larger and smaller spheroidal cells are present, but vary considerably in number in different parts of the tumor.

The teased preparations show, furthermore, in the most evident manner, the mode of origin of the hyalin material. This is formed, as shown in fig. 2, B., by an irregular degeneration of parts of the tumor cells. These are sometimes to a slight extent, sometimes almost completely, converted into the hyalin material, and are to a corresponding degree distorted and deformed. In some cases the whole thickness of the cell is not converted into the hyalin material, but the latter appears in the form of irregular shining masses or droplets completely enclosed by the cell protoplasm.

In the separated cells as well as in sections, the abovementioned micro-chemical reactions were obtained.

Similar translucent masses have been described in tumors of the optic nerve by several observers. Structures which, judging from his drawings, were similar to these degenerated cells, were described by Perls,[1] as occurring in large numbers in a tumor of the optic nerve which he regarded as a true neuroma. The cells were considered to be ganglion cells; and the translucent shining material myelin in the process of formation about the fibre-like branches of the cells. The probability that this conception of the nature of the cells and translucent shining material by Perls was an error, has been pointed out by Vossius and Lebert,[2] who have described the same appearance in similar tumors of

---

[1] Perls: *Arch. für. Ophthal.*, Bd. xix., Abth 2, p. 287.

[2] Vossius: *ibid.*, Bd. xxviii., Abth. 3, p. 33.

the optic nerve, and who also had the opportunity of examining the original tumor of Perls. Lebert examined the translucent material in the fresh condition, and found that it did not stain black on treatment with osmic acid. If, as seems probable, this criticism is correct, a true neuroma of the optic nerve seems never to have been described.

Dr. Johnson's tumor was not received in the fresh condition, so that the usual micro-chemical reactions for fresh nerve tissue could not be employed; but a series of the tests applicable to preserved nerve tissue were made, all of which failed to give any indication of nerve elements in the tumor tissue proper, outside of the limits of the optic nerve. Among the tests above alluded to were the prolonged staining with dilute gold-chloride solution and reduction in caustic-soda solution; the use of the chloride of palladium and subsequent staining with carmine.

As the hyalin material retains the color imparted by acid fuchsin, it was not surprising that the acid fuchsin staining of Weigert should give a very excellent staining of the degenerated portions. It was, however, a surprise to find that the hematoxylin method of staining nerve tissue as described by Weigert gave most exquisite pictures of the topography of the degeneration; the hyalin material being stained bluish black, just as the myelin is, in successful preparations of the nerve tissue. This possibility of a similarity of reaction in hyalin material and in myelin must, therefore, evidently be borne in mind, if the possibility of error would be avoided in using either the hematoxylin or the acid fuchsin method of Weigert for staining nerve tissue.

The microscopical examination of the enlarged portion of the optic nerve, which passes through the tumor, shows that there is a considerable increase of the connective-tissue septa which divide the nerve into bundles, and also a very marked growth between the individual nerve fibres, apparently from the neuroglia, of cells similar to those composing the more characteristic parts of the tumor proper. The same hyalin degeneration is seen also in the new cells of the optic nerve, but it is most abundant in the periphery of

the bundles along the sides of the connective-tissue partitions of the nerve. The nerve fibres are in part normal, but, especially in the middle and posterior portions, they are to a considerable extent atrophied.

That part of the optic nerve which lies between the tumor and the globe shows simply a marked increase of the interstitial fibrillar connective-tissue, with corresponding atrophy of the nerve fibres, with here and there small masses of hyalin material, but none of the characteristic tumor cells.

In the tumor tissue proper there is hyalin degeneration of the walls or about the walls, especially of the smaller blood-vessels, as represented in fig. 3.

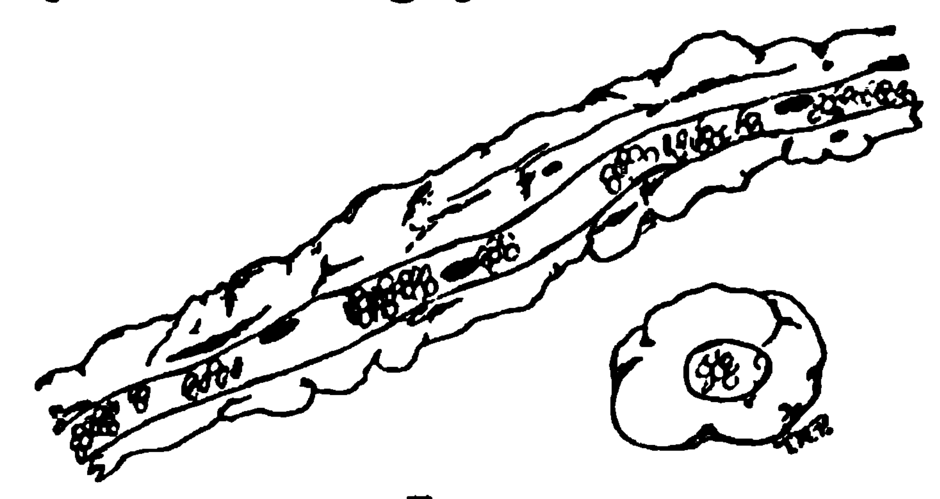


Fig. 3.
Capillary blood-vessels with hyalin degeneration of the walls.

Microscopical examination of the enucleated eye shows considerable increase of the connective tissue of the optic nerve, with corresponding atrophy of the nerve fibres and thickening of the walls of the retinal artery. There are patches of œdema of the retina, particularly of the outer layers. The choroidal blood-vessels are generally and deeply congested, and in the sections made there was found one small patch of atrophy of the choroid near the optic papilla. The eye appeared otherwise normal, but the nerve elements of the inner layers of the retina were not well preserved, so that their condition could not be determined.

The tumor apparently originated in the neuroglia of the optic nerve, or in the connective tissue of the inner sheath. Its growth was largely in the space between the external and internal nerve sheaths, and only to a moderate degree in the interstices of the nerve itself.

Recklinghausen reported hyalin degeneration of the blood-

vessels in one of the earlier cases. The translucent, shiny masses, as above stated, have been described and figured by several observers. Vossius conjectures that they might be of a "hyalin-colloid" nature; but otherwise the nature of the material has been but indefinitely characterized.

It will thus be seen, if the interpretation placed by the writer upon the character of the degenerated portions of these tumors be correct, that hyalin degeneration, which is of occasional occurrence in a great variety of tumors, is quite frequent in the myxo-sarcomata of the optic nerve, and may give rise, here as elsewhere, to very peculiar and oftentimes puzzling microscopical appearances.

It is not necessary for the purposes of the present paper to make a detailed reference to the bibliography of tumors of the optic nerve. Twenty-seven cases were collected by Willemer, *Archiv für Ophthal.*, Bd. xxv., Abth. 1, p. 161, 1879. This number was increased to thirty-six by Vossius, *Archiv für Ophthal.*, Bd. xxviii., 1882, and in his article references may be found to the literature up to that date.

Another case has since been described by Veron, *Recueil d'Ophthalm.*, Jan., 1883, Reviewed in ARCHIVES OF OPHTHALMOLOGY, vol. xiii., No. 2, p. 283.

A CASE OF ACUTE PRIMARY INFLAMMATION OF THE LACHRYMAL GLAND OCCURRING TWICE IN THE SAME INDIVIDUAL.

By J. F. FULTON, M.D., St. Paul.

THIS following observation appears interesting on account of the rarity of the disease and its very severe character in this case. Dacryo-adenitis must be very rare, as but very few cases are to be found reported in the very extensive literature of ophthalmology.

This is the only case I have met with in private practice.

Jules, in his recently published work on ophthalmology, says inflammation of the lachrymal gland is extremely rare.

Henry R. Swanzy, in his "Handbook of the Diseases of the Eye," makes this remark: "I have seen *one* case of acute purulent dacryo-adenitis, but no instance of the chronic affection."

Carter says: "The lachrymal gland is seldom diseased; insomuch that I have only met with a single instance."

Miss Maggie M., aged twenty, was sent to me about a year ago, by Dr. Leasure of this city, with a very extensive swelling of the upper lid, especially of its outer part, crowding down upon the eyeball so as to displace it downward and inward so that the patient could not possibly move the eye outward. The suffering of the patient was very great. The swollen, inflamed gland could be easily made out by manipulation with the fingers, and its outline could be seen between the ball and lid by elevating the upper lid as much as possible. This gland being placed in a depression of the orbital plate of the frontal bone can only advance forward into the orbital cavity when it becomes inflamed, and, by pressure on the

orbital tissue and the globe, is capable of producing great agony, as it did in this case. The conjunctiva was injected but produced no discharge. At the height of the inflammation this membrane became chemotic at the external canthus. The skin of the upper lid became quite red and continued so for a number of days. The pain was of a throbbing nature and very much increased by pressure, so that a digital examination was quite out of the question. An inquiry into the history proved that the patient had a similar attack about three years previous, with all the symptoms much less severe, which also ended in resolution. She was treated at that time by Dr. Atwood of this city and was cured in about two weeks. The patient was perfectly healthy and never had any form of eye-trouble. She never received any injury of the eye and never had acute or chronic conjunctivitis; so no cause could be found to account for the trouble. Both attacks seemed to be acute primary inflammation of the lachrymal gland, as no other tissues were involved except secondarily.

She was treated antiphlogistically. Several leeches were applied in the region of the swelling and hot compresses frequently applied. Under this treatment the inflammation soon subsided and the enlarged gland became less and less prominent from day to day. The leeches relieved the pain quite promptly. At the end of ten days the inflammation had entirely disappeared, and nothing remained save a slight enlargement of the gland, and this was completely removed by the repeated applications of an ointment of the iodide of potash.

The literature of this subject is not extensive. Galezowski and Mackenzie have written more at length on inflammation of the lachrymal gland than other authors. They both make what seems to be an unnecessary division of the subject, viz., (a) inflammation of the *palpebral* portion of the gland, and (b) of the *orbital* portion. In 1881 Galezowski reported seven cases in *Recueil d'Ophth.* In the transactions of the American Ophthalmological Society for '84 Pooley reports "A Case of Acute Dacryo-adenitis." In this paper Dr. Pooley says: "The interesting and unusual feature in my case is the occurrence of an acute inflammation of the gland during the course of an acute diphtheritic inflammation of the other eye, and raises the question in my mind whether it may not have been caused by septic absorption."

In the discussion followiug this paper Dr. Knapp said: "The cases which I have seen had no infectious origin, and in the majority of instances no conjunctival complications. Most of them did not suppurate." Dr. K. thinks if more attention were directed to this affection it would be found more frequent. Mr. Todd, in the Dublin Hospital Reports, describes a few cases, the most of which were the result of some form of conjunctival trouble.

A CASE OF SEVERE ORBITAL CELLULITIS, THE RESULT OF THE PASSAGE OF BOWMAN'S PROBE INTO THE NASAL DUCT.

By JOHN F. FULTON, M.D., Ph.D., St. Paul.

NOTHING could be more humiliating than the loss of an eye by so simple an operation as the dilatation of a stricture of the nasal duct; yet that such an accident may happen is indicated by the history of the following case:

Mrs. M., aged twenty-six, with general health in a fair condition, was placed under my care in October, 1883, by her brother-in-law, a German minister of this city. She was suffering with a blennorrhœa of the lachrymal sac, the result of a stricture of the nasal duct. This condition had been of about three years' standing. The chronic dacryocystitis was often aggravated by acute attacks of the inflammation, which gave rise to great pain, and extended to surrounding tissues. There was a large fistulous opening out on the cheek, through which the tears flowed, together with the discharge from the suppurating sac, which produced an eczematous condition of the skin. The patient being from the country, and extremely anxious to return as soon as possible, contrary to my usual custom I slit up the canaliculus and passed a No. 4 Bowman's probe at the first visit. The stricture was tight, but I succeeded in passing it without using much force. No violence whatever was resorted to. There was no hemorrhage into the nose following the passage of the probe. Patient was sent home with instructions to return on the following day. Forty-eight hours after this I was called to the patient's house and found her in great agony. An inflammation had extended from the lachrymal lesion to the orbital tissue; the symptoms being ex-

tensive, chemosis of conjunctiva, slight protrusion of the eyeball, and considerable tumefaction of the lids, especially the upper one. The pain was very great ; referred to the orbit and extending down upon the cheek. The motion of the eye was considerably interfered with in all directions, and gave rise to pain. Fever had commenced a few hours before I saw the patient, and she was quite restless. The vision in the eyes was becoming dim. A brisk cathartic, leeches to the temple, and perfect quiet was the treatment ordered. I returned next day to find all the symptoms intensified, and the patient greatly alarmed, fearing that she would lose her eye, and disposed to blame her surgeon for the accident. The exophthalmus and limitation of the motion of the eyeball well marked ; great hardness and infiltration of the orbital tissue. The cornea had become anæsthetic and the patient still more feverish, and the condition of the eyes was somewhat alarming. I was still in hope, however, that the parts could be relieved without suppuration, and in order to accomplish this a puncture of the greatly congestive orbital tissues was advised and urged. A Graefe's cataract knife was passed through the conjunctiva into the orbital tissues at the lower border of the orbit, near the inner canthus, between the recti muscles, and the swollen tissues freely incised down to the periosteum. This was followed by a free discharge of bloody serum. The same procedure was repeated at the upper and outer part of the orbit.

On the following day the parts were very much relieved, and continued to improve from day to day, and the symptoms had nearly all subsided at the end of ten days without doing any damage to the eye.

Cellulitis of the orbit is a rare disease, except as the result or complication of an erysipelatous inflammation of the face, or from caries of the orbital parietes. There was no suspicion of either condition in this case. Neither the examination before the accident, nor any during the course of future treatment extending over weeks, ever revealed any evidence of caries or of inflamed bone. This trouble is sometimes due to metastasis, but could not have been in this case, as there was no other seat of inflammation. She had no uterine trouble of any kind, and all the organs of the body were healthy. Primary orbital cellulitis is an extremely rare disease in healthy adults. It is met with in

delicate children, but in a mild form, and is easily controlled.

Dr. A. Hill Griffith in the *Ophthalmic Review* quotes Berlin as saying that the great danger of orbital cellulitis is the occurrence of thrombosis of the ophthalmic vein. "He states that even when this has taken place, resolution may occur or fatal pyæmia be set up without the process of thrombosis extending beyond the orbit; or lastly, sinus-thrombosis may supervene." It was this that produced the fatal result in the case reported by Griffith. The dimness of vision referred to in the clinical history of the case which I have reported was probably caused by the swollen orbital tissue producing a retardation and stagnation of the venous blood, and by pressure on the optic nerve. This was relieved by a timely puncture before any grave lesion of structure or function had taken place.

The manner in which the accident occurred must have been as follows: The dilatation of the stricture produced an inflammation of the surrounding parts; this extended by contiguity to the orbital tissue, and gave rise to the very severe inflammation of these tissues which I have described, requiring the most active measures to save the eyeball. This case shows that the most insignificant operation about the eye may produce a most severe and dangerous disease, and the great benefit to be obtained by an early puncture in cases of inflammation of the orbital tissues. In those very severe cases of orbital cellulitis which occur as a sequela of facial erysipelas, so dangerous to sight and even to life itself, it seems likely that they could frequently be cut short, and suppuration be prevented, by an early and efficient incision of the inflamed and swollen tissues of the orbit.

EVISCERATION OF THE GLOBE.

By E. L. HOLMES, M.D., of Chicago.

In the fall of 1876 a boy, seven years of age, in good health received a puncture of the left cornea, iris, and lens, from the blunt end of a small branch of a tree. Two days after the accident, when the case came under my care, I found the anterior chamber obliterated or partly filled with blood, fragments of lens, and shreds of iris. It was impossible to determine how far the branch had penetrated beyond the lens or whether minute particles of dry bark were within the globe.

The treatment was confined to rest and to the use of atropine and of wet compresses. There was no hope that the patient would regain useful vision, and scarcely a hope that the form of the eye would be preserved. In a few days the ocular conjunctiva and lids became œdematous with marked symptoms of panophthalmitis. There was less pain than is usual in such cases.

As it was soon evident that suppuration was progressing, I performed, with the assistance of Prof. C. T. Parkes, the following operation, while the patient was under the influence of ether. After the cornea had been removed by means of a cataract knife and scissors, pressure upon the globe expelled the intra-ocular contents, composed principally of degenerated vitreous humor mingled with pus and blood. By means of the tip of the finger the retina, choroid, and ciliary muscle were completely separated from the sclerotic and removed. Wet compresses upon the lids were the only applications in use. The œdema increased for a couple of days when convalescence proceeded as in ordinary enucleation.

I had already performed this operation in a few cases but cannot recall the particulars. Since the date above given I have often performed it at the Illinois Charitable Eye and

Ear Infirmary, in private practice, and at the Presbyterian Hospital,—in fact I have not extirpated a globe with panophthalmitis, but have in all cases simply removed the cornea and intra-ocular contents. I have never observed serious symptoms follow the operation.

I can scarcely be persuaded by my own experience that the use of antiseptic remedies in the operation of evisceration or enucleation, as in the large number of operations on the conjunctiva and lids, is of special advantage to the patient as compared with cleanliness attained by the use of water.

I have no means of ascertaining the total number of these operations I have performed during the past twenty-eight years. They are in the aggregate many hundred. I have never observed a single instance, in which an enucleation was followed by the slightest symptoms of cerebral complications, or in which an operation on the lids or on the conjunctiva did not heal kindly with the use of simple water-dressing. In deference to the opinion of many distinguished writers, however, I now apply invariably solutions of boric acid, borax, and bichloride of mercury. Their use in operations involving the cornea especially and the sclerotic I consider imperative.

The operation for evisceration of the globe has been recently recommended by Prof. Graefe, of Halle, and others, as if independent of previous operators, although it is mentioned in Well's work on the eye (Bull), and in the recent volume of Prof. Noyes. I have limited the operation to suppurative cases, but see no reason why we might not expect satisfactory results in nearly all cases of non-malignant disease, in which enucleation would otherwise be indicated. The subsequent condition of the orbit seems to be more favorable for the adaptation of an artificial eye than after the ordinary operation. Future experience must determine whether unlooked for danger may be encountered in this substitute for enucleation.

April 1, '85.

OPHTHALMOMETRY WITH THE OPHTHALMOMETER OF JAVAL AND SCHIÖTZ, WITH AN ACCOUNT OF A CASE OF KERATO-CONUS.

By SWAN M. BURNETT, Washington.

(*With three wood-cuts.*)

JAVAL and Schiötz exhibited their perfected ophthalmometer at the meeting of the International Medical Congress held in London in 1881. I have not been able to find, however, any published papers, embodying results of experimentation with the instrument by others, outside of two or three on the continent.[1]

In England and America, so far as my knowledge of their ophthalmic literature extends, no publication has been made.[2]

Having used one of these instruments in my daily practice for some months, I feel it but due to the ingenious inventors, and hope it may be not without interest to the practical ophthalmologist, to place the results of my observations on record.

Any description of the instrument itself is not necessary here, since this is accessible in the papers published by the inventors in the *Annales d'oculistique* for Juil.–Août, 1881; Mai–Juin, 1882; Juil.–Août, 1882; and Jan.–Fév., 1883. These articles contain all that is necessary for a thorough understanding of the principles on which the instrument is built, the method of its construction, and the manner of

[1] Laqueur, *Gräfe's Archiv*, xxx., 1, p. 99; Angelucci, *Ann. di Ott.*, xiii., fas. i., p. 35.

[2] Juler (*Brit. M. J.*, 1884, ii., p. 1274) speaks disparagingly of the instrument.

using it. From a careful reading of them, no practitioner with a knowledge of the fundamental principles of optics can have any difficulty in taking the instrument from its packing-case, setting it up, and manipulating it with satisfaction.

Its prime, and indeed only, function is the determination of the character of the corneal curvature.[1] That is its limitation; but when we consider that astigmatism is almost wholly corneal, and that it forms more than one half of the cases of refractive anomalies presenting for treatment, the importance of knowing the exact curvature of the cornea in all its meridians becomes apparent.

The ophthalmometer does not give us the refractive condition of the eye as a whole, and furnishes no positive indication as to the existence of myopia or hypermetropia,[2] but it gives with exactness the radius of curvature of the cornea in all its meridians; and, where there is a difference, it shows the direction of the principal meridians, and we can read on the instrument the amount of the difference in dioptries and fractions. The inventors claim that a difference of 0.25 D can be readily detected, and my own experience would substantiate this statement.

The main question is: Is it practical? I most unhesitatingly answer: Yes. Taking all things into consideration, it seems to me the most practical of all the instruments of precision we use in the diagnosis of astigmatism. I have found many ophthalmologists who have confessed that they did not rely on the ophthalmoscope in the diagnosis of refractive anomalies. That seems to be an art which all cannot learn; but I can hardly imagine a practising oculist

[1] For which reason I think the term *keratometer* much more accurately descriptive than ophthalmometer. The term *keratoscopie* should be reserved for a simple inspection of the corneal surface without any measurements, as with Placido's circles or Wecker's square.

[2] Since writing the above, I have examined a case which demonstrates this very perfectly. In the left eye 110° had $r = 7.8$ *mm.*; 10°, $r = 8.4$ *mm.*; in the right eye 80° had $r = 7.8$ *mm.*; 170°, $r = 8.4$ *mm.* In both the bands crossed 1¼ steps. When it came to correction, however, it was found that L required +1.25 (110°), while R required −1.25 (80°). As the person was over sixty years of age, we could hardly suppose the existence of spasm of A in R. The M must therefore have been due to an elongation of the antero-posterior axis of the globe, of which fact, of course, the ophthalmometric measurements gave us no hint. I have also examined two cases in which M = 10 D existed in one eye, and E in the other; but both corneæ had the same radius of curvature.

that could not manipulate the ophthalmometer with success —certainly to the extent of detecting an astigmatism of 0.5 D.

Another advantage is the rapidity with which examination can be made. When the instrument is in position, it consumes even less time than an expert would take in making the same determination with the ophthalmoscope—that is, less than two minutes, including the reading and recording of the measurements.

No other form of keratoscopy can compare with it for precision and accuracy. I have used Placido's disc and Wecker's square, but must confess that in regular astigmatism I have found them worthless. They sometimes, in astigmatism of high degree, give indications as to the direction of the principal meridians, but I have never been able to estimate within two or three dioptries of the degree.

It is in cases of astigmatism of high degree, and particularly in mixed astigmatism, where the instrument of Javal is of most essential value, for it is precisely in such cases that the subjective methods of examination are so tedious. With the ophthalmometer you obtain at a glance the data required for a speedy solution of the difficulty.

I will not lengthen this paper by giving any tabular statistics, suffice it is to say that in about 100 astigmatic eyes I have not found a difference of more than 1 D between corneal and total astigmatisms, and that only in a single case. I will relate one case of kerato-conus in full, which not only shows the value of the instrument, but has also, I think, an interest and importance of its own.

Mrs. R., twenty-seven years of age, says she saw well up to her sixteenth year. At that time her vision began to fail, and gradually got worse until her nineteenth year, since which time it has remained about as it is now. On October 6, 1884, the time of the first examination, $V = \frac{2.5}{60}$. With —6^s she saw with either eye No. 60 at 4 metres, and no other spherical lenses gave further improvement. As is my habit, I then made an ophthalmoscopical examination before trying cylinders, since I thereby obtain at least some indications of the nature of the trouble, particularly if there is a high degree of astigmatism. On making this examination I at once found that I had to deal with a case of kerato-conus.

Even in the inverted image it was not possible to see all parts of the disc clearly, and there was that excessive parallactic movement of the vessels which is so characteristic of kerato-conus when this method of examination is used. When the light from a plain mirror was thrown into the pupil from a distance, as in the shadow test,[1] the peculiar unstable shadow crescent of conical cornea was beautifully shown. Examination by the direct method was in the highest degree unsatisfactory. At no time, and with no lens, could I get more than a part of two or three vessels in focus at once, and the least movement of the eye would throw those out of view and bring others forward. Some idea of the peculiar distortion of the vessels may be obtained from the accompanying diagram (fig. 1), which represents the disc as seen in the R eye, with

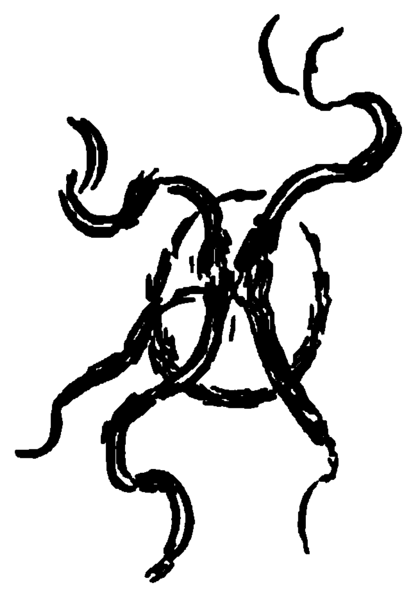


FIG. 1.

+ 4 behind the ophthalmoscope. The black lines represent the parts of the vessels which were seen distinctly; the shaded portion, the parts that were out of focus.

The ophthalmoscope, therefore, which in cases of regular astigmatism of high degree is invaluable in giving us a clue to the character of the anomaly, was here of no avail.

The average radius of curvature of the normal cornea is somewhat less than 8 *mm.* In Mrs. R. the radius of curvature of the cornea was shortened in all the meridians, and in different parts of the same meridian, and a wide departure from the normal was found. The most nearly regular part was found, not directly in the line of vision, but about five degrees outwards in each eye. When in this position, the meridian in the R at 10° had a radius of curvature of only 5.4 *mm.*, and at 110° a radius of 6.8. The

[1] I think this name is preferable to keratoscopy, retinoscopy, pupilloscopy, phantoscopy, or any of the others that have been applied to this method of examination. Perhaps, for scientific nomenclature, we had better adopt the word *skiascopy*, as suggested by the French Hellenist, M. Egger.

left cornea had a radius in about the same locality of 5 *mm.* in the meridian at 180°, and of 6 *mm.* in the meridian at 90°. Even in these meridians there was a rapid change in these figures as soon as the point of measurement was removed a few degrees from the place indicated. The shape of the bands became very much distorted, and it was impossible to take accurate measurements. It was very evident, however, that the corneal surface became flatter as it approached the periphery. The distortion began much sooner on the outer side of the point indicated in both eyes. In R I measured the radius in 180° at some 20 degrees out and in from the apex, and found it inwards 7.5 *mm.*, and outwards 8 *mm.*, approximatively. The distortion was also greater in the upper than in the lower portion of the cornea.

These measurements, while showing a very great irregularity in the corneal curvature, gave me an idea of the direction of the meridians of greatest and least refraction near the visual axis, which was of great value in my further unravelling of the tangled threads of evidence. I read off on the arc of the instrument that in L, 180° had about 38 D, and 90° had 34 D—the difference being 4 D; and when the bands were in contact at 90°, they crossed 3½ steps of the graded arc at 180°. In R, 10° had 36 D (the normal being near 20), and 110° had 30 D, and the bands were superposed 6 steps at 10°, when they were in contact at 100.°

These data gave me no hint of the *character* of the regular astigmatism, but I now knew the *amount*, and approximately the direction of the principal meridians.

From the very short radius of curvature in all meridians, we naturally expected to find a high degree of myopia, but on testing with glasses it was found that while in L, with $- 9 - 4^{cy}$ 180°, some letters of No. 12 were made out, in R some of No. 9 were seen, with $+ 4^{cy}$ 180° $- 2.5^{cy}$ 90°. No. 1, of Wecker was read by both at 8 inches. It should be stated that the examinations with glasses were repeated many times, and under the full effect of atropine ; and the result as regards vision was the same with the same glasses, with and without the mydriatic.

Javal has added a Placido's disc to his instrument since 1881, and it has increased its value very much for the determination of *irregular* astigmatism. I had found the disc of Placido very useful for this purpose, and by it have discovered varying degrees of irregular astigmatism in many cases where V could not be

brought up to $\frac{20}{20}$ by any optical means. As we always have a certain and usually a very large amount of irregular astigmatism[1] in kerato-conus, I made careful examinations of both eyes of Mrs. R with the disc.

In fig. 2 is found the form of the disc at the corneal apex, 15° upward and downward, and 20° on either side in the left eye.

It will be observed in these figures that even at the apex there is quite a distortion below and to the outer side, while in all directions towards the base of the cornea the peripheral portions of the rings are drawn out and flattened, indicating a great reduction of its curvature at this portion of its surface. The striking feature about these figures, however, is their close approach to uniformity and similarity in form, indicating a much greater regularity of curvature than is



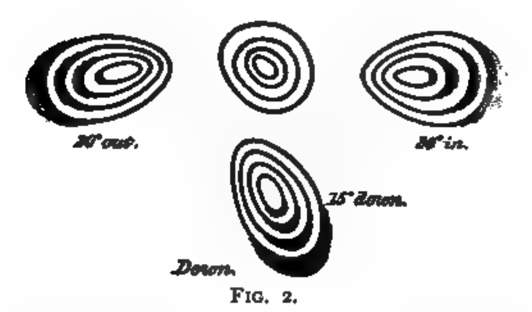


FIG. 2.

usually found in conical cornea, and much more regularity at apex than the cornea of the case of recent extraction of the cataract shown in fig. 3. In fact, if we are to judge from these figures, the cornea approaches in form in this instance to an ellipsoid of revolution, though of course we know by ophthalmometer measurements that there is a compression laterally, as shown by the existence of so large an amount of regular astigmatism. Such a case would seem, theoretically, to be well adapted to the use of hyperbolic lenses,

[1] See a paper by Angelucci in *Ann. di Ottal.*, xiii., 84, fas. 1.

and I much regret that I did not have an opportunity of trying them.

But the results obtained by cylindrical lenses are very gratifying, and encourage us to hope that with the aid of the ophthalmometer, many cases of kerato-conus, which have heretofore been deemed fit only for operation, will find a remedy in optical appliances.[1]

In the R eye the images of the circles were even more regular in form than in the L, and there was much less distortion at the apex of the cornea, and this is the eye which received the greatest benefits from the cylindrical lenses, vision being brought up to nearly $\frac{4}{9}$.

I have made ophthalmometric measurements of three eyes on which I had operated for cataract by extraction. Unfortunately none of these eyes were so examined before the operation, but it is a fair assumption that both eyes were nearly alike when the patients so state. In one there was that rather rare accident of a reopening of the wound nine days after the operation, and the examination was made only four days after it had again closed. At that time there was an astigmatism of 5.5 D in the meridian at 45°, corresponding pretty well with the place where the wound had given way, and the radius of curvature in that meridian was more than one millimetre longer than in the meridian at 135°. Examined fourteen days later, a marked change was found. 45° had now only 8.1 *mm*, while 135° had 8.4 *mm* radius, the difference amounting to 1.25 D, the *shorter* radius being now at 45°. When a + 1^{cy} with the axis at 45° was added to his cataract glass vision was much improved. In the second case the operation was a typical one, with Wecker's incision wholly in the cornea. There was no reaction until the ninth day, when an iritis set in. The wound had closed perfectly, but cicatrization was not complete on the eleventh day, when I made opthalmometric measurements. The extraordinary degree of irregular astigmatism is shown by the distortion of Placido's disc in fig.

[1] It now becomes a possibility that the hyperbolic lenses of Raehlmann' which have afforded decided advantage in cases of kerato-conus over cylinders' can be manufactured to order to suit each particular case from data furnished by the keratometric measurements.

3. Combined with this there was also a very large amount of regular astigmatism, as indicated by the elongated form of the disc.

On measuring the corneal curvature I found that 90° had $r = 9.9$ *mm* (11 D); 180°, $r = 8.$ (21 D); making a difference of 10 D. The cornea of the other eye (which was also cataractous) was free from astigmatism of any kind. It is interesting to note that the other eye, operated on since the above was written, followed the same course, the iritis lasting six weeks. It was accompanied by analogous changes in the corneal curvature. Both corneæ became subsequently almost normal in curvature.

In another case, four weeks after extraction, in which there were no complications, either during or subsequent to

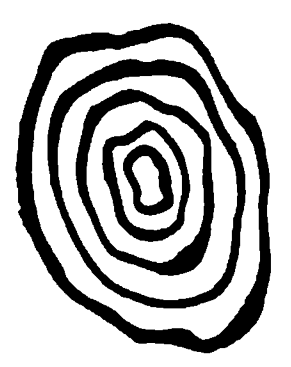


FIG. 3.

the operation, there was a corneal astigmatism of 2.25 D, the more strongly curved meridian being at 100°; and vision was much improved by the addition of this cyl. to this spherical. The fellow-eye showed no abnormality in its corneal curvature. Measurements ten days subsequently showed a decrease of the astigmatism to 1.5 D.[1]

A number of accurate ophthalmometric measurements of eyes operated on for cataract by extraction, would give us valuable indications as to the kind of section which would be likely to give us a minimum of deformity in the corneal curvature.

Another field for usefulness of the ophthalmometer will be in the selection of a place for making an iridectomy in cases of leucoma of the cornea etc., where there is left any choice of clear cornea. The instrument will show us at once which portion of the corneal surface is most nearly regular, and under that we can make the artificial pupil.

[1] See papers on this subject by L. Weiss, These ARCHIVES, vi., p. 432; and Laqueur's paper, *l. c.*

A CASE OF GREAT SWELLING OF THE EYELIDS AND FACE FOLLOWING AN UNSUCCESSFUL ATTEMPT TO EXTRACT THE UPPER CANINE TOOTH ON THE LEFT SIDE; ABSCESS OF THE ORBIT; TOTAL BLINDNESS; ATROPHY OF THE DISC; OBLITERATION OF THE RETINAL VESSELS.

By Dr. SWAN M. BURNETT, Washington.

(*With one wood-cut.*)

John H. Davis, a colored man, aged thirty-five, was operated on for cataract of the right eye by extraction, in 1874, with partial success only. The left eye continued to have perfect vision until the 28th of January, 1884. At that time the upper canine tooth on the left side began to ache, and he went to a dentist for the purpose of having it extracted. This the dentist attempted to do, but failed after many persistent efforts. He told Davis that the jaw-bone was broken from the violence of the pulling. That same evening the left side of the face began to swell and be painful, and soon the left eye was closed. As it could not be opened for nearly two months, he was not able to tell whether there was any protrusion of the ball or what its condition otherwise was. At the end of twenty-one days, during which time there was fever, but no chill nor mental disturbance, a discharge set in from the region of the inner canthus, and afterward from the forehead and the cheek near the lower orbital ridge. When the swelling subsided so as to enable him to open his eye, he found that vision was abolished, not even perception of light remaining.

On the 20th of May, 1884, when I examined him for the first time, I found the eye in proper position and its movements perfect. There was a depression at the outer portion of the lower orbital ridge extending two *cm.* downward into the cheek, caused

by exfoliation of bone. There was no scar either in the skin or conjunctiva near the inner canthus. Exophthalmus was not present. There was no perception of light.

An ophthalmoscopic examination revealed a condition of the fundus shown in the accompanying sketch (fig. 1). The disc-surface is sharply outlined, dead white, and not excavated. From its lower edge there ran three white lines downward, one almost directly, one deviating inward, and one running downward and

Fig. 1.

outward. This latter divided and sent a branch which ran the unusual course shown in the figure, passing upward to the level of the centre of the o. d., becoming nearly horizontal, and sending at the same time two short branches downward. The other branch passed diagonally downward and outward, and became forked, as did the other two white bands running downward.

From the upper edge of the disc one white band ran inward and upward for about the same distance as its companion on the same side below, but was not forked at the end. Proceeding from

a point somewhat above the centre of the disc and towards its inner edge there ran upward two vessels filled with blood, one smaller and lighter in color than the other. The lighter one curved slightly outward, sending one branch directly upward, and another, very fine, almost horizontal. The larger, darker vessel ran a course almost parallel to this one, but gradually diverged slightly to the outer side. It sent off no horizontal branch, but just where this branch should be given off there was a white band which ran outward and curved slightly downward. A very delicate light vessel ran upward and inward between the upper white band and the larger light vessel. On the surface of the disc several dark and very tortuous vessels were seen, all of them, except one, very delicate and fine ; three of them ran outward and two downward to the edge of the disc, but none of them could be followed over the border. None of the lines, either red or white, were broken—they were either red or white throughout,—but to the outer side of the smaller red vessel there was a distinct white line about ½ of an o. d. in length, and the same thing was observed on the outer side of the larger dark vessel, just where it was joined by the large white line running horizontally. The fundus was even in tint, with the exception of two places : one above the bifurcation of the middle lower white band, and the other a little beyond the macula-lutea region and under the curve of the white line taking the unusual course. These alterations consisted in dark or black dots and larger masses, together with perfectly white and glistening dots and lines, which ran for the most part horizontally. These last alterations were found almost exclusively in the yellow-spot region as shown in the figure.

The interest of this case lies in the striking resemblance —the exact identity, in fact—of the ophthalmoscopic appearances to those found in blindness after facial erysipelas. If one will take the trouble to compare the drawing of our case with the fine chromo-lithographic plates of Knapp's case of blindness from erysipelas of the face in vol. xii. of these ARCHIVES, and Carl's case in *Zehender's Monatsbl. f. Augenheilk.* for April, 1884, it will be seen at once how all three agree in essential particulars. The question of the connection between erysipelas affecting the face and the orbital and ocular changes associated with it has been too recently discussed to render any further comment on the

subject necessary. Knapp has, from his careful observation of a case from the beginning, clearly shown, I believe, that all the intra-ocular changes are due to mechanical pressure within the orbit, and that none are due to the specific poison of the disease. Our case lends support to that view, for the clinical history does not warrant a diagnosis of erysipelas. On the contrary, it is almost certain that there was an abscess of the antrum of Highmore caused by a fracture of its walls from the forcible but unsuccessful attempt to extract a tooth, which led to the inflammation in the orbit. Further evidence of this is the destruction of a part of the maxillary bone at the lower edge of the orbit.

It has been known for a long time that abscesses in the antrum were attended by inflammations of the orbital tissues, followed by blindness. In 1862, Mr. James A. Satler, surgeon-dentist to Guy's Hospital, reported such a case in the Medico-Chirurgical Transactions, vol. xlv.; and he alludes in his paper to an article by A. Th. Brück on "Repeated Inflammations in the Antrum of Highmore and Amaurosis," published in *Caspar's Wochenschrift f. d. gesam. Heilk.*, March, 1851.

Reference to some of the more recent literature of orbital and ocular disease associated with dental caries can be found in an article by Vossius in *Graefe's Archiv* xxx., p. 157. Vossius' case, however, differs in many essential particulars from mine.

It can be readily understood how such abscesses of the antrum lead to inflammations and abscesses within the orbit. The wall of bone separating the two cavities is extremely thin, and will give way easily to the increased pressure within the antrum ; or the inflammation might be propagated along vessels which may happen to pass from the one to the other.

A NEW CASE OF INJURY TO THE EYE FROM A STROKE OF LIGHTNING.

By Dr. CARL LAKER, of Gratz.

(*With a colored drawing; the upper one on plate viii.*)

Translated by Dr. J. A. Spalding, Portland, Maine.

I TAKE great pleasure in communicating a new case of injury to the interior of the eye from a stroke of lightning. The soldier thus affected met with the injury in Herzegovinia, but while being transported homeward I had an excellent opportunity of examining his eyes, as he remained for a few days in the hospital at this place.

Johann Zopko, æt. twenty-three, was sitting, with eleven of his comrades, during a passing thunder shower, in a small watch-house, in one of the windows of which a pane of glass was missing. A flash of lightning passed through this opening and into the guard-house without shattering the building or setting it on fire, and then disappeared in the ground, leaving only a large hole behind.

The entire twelve soldiers were more or less injured, but Zopko alone in the eyes. He declared that he fell unconscious to the ground, without noticing the flash at all. His comrades restored him to consciousness by chafing his limbs and body, but he does not remember how long he remained unconscious. When he came to his senses he could not distinguish between darkness and daylight, and suffered for several hours from violent tonic and clonic spasms of both lower extremities. He also felt excessively weak. He affirms that there were never any traces of external injuries visible, and when I examined him carefully I could discover no indications of traumatism or burns. For about a week he re-

mained totally blind, then vision began to return, and in about two weeks attained the amount at which it had remained constant up to the time at which I saw him, six months from the time of the injury. He asserted that the sight of the right eye began to return a few days previous to that of the left eye. The patient at present complains only of a periodical itching in his eyes, from which he never suffered before, and of his defective sight. He denies that he ever suffered at any time from photopsies, dazzling, hemeralopia, or photophobia, before or since the accident.

The patient can neither read nor write, for he was never sent to school, but he is sure that he could see as well at a distance as the average person previous to receiving the lightning stroke.

Refraction + 1 D, in both eyes, determined with the ophthalmoscope. Vision tested by Snellen's hook-types, R E, $\frac{6}{60}$; L E, $\frac{3}{60}$.

The objective condition of the eyes is as follows : Conjunctiva of the lids slightly catarrhal. Both pupils (more in the right eye than in the left) are somewhat eccentric and oval, rather dilated and very sluggish in reaction, as well to direct irritation of light as to sympathetic irritation. Nor do they dilate but slowly and hardly more than to half the normal extent after the instillation of a two-per-cent. solution of atropia, while even then they are simply more eccentric than before, the right medially, the left upward and still more oval than before. There is no trace of posterior synechiæ. Tension nearly normal.

Numerous dotted opacities are visible in the anterior cortex of the right lens by oblique illumination, while though also noticeable in the left cortex they are less abundant and moreover united by delicate linear opacities. The cornea and vitreous are perfectly transparent.

The ophthalmoscope reveals in both eyes a hazy, brownish-red retina and indistinct contours of the optic papilla. The arteries are somewhat thinner than normal and the vessels generally, especially near the papilla, show ill-defined contours where they run through the opaque layers of the retina. Both optic papillæ are grayish and discolored.

Peculiar conditions are visible at the macula lutea. In the right eye the locality of the macula is occupied by a bright-red, round spot, larger than the macula, surrounded by a border of pigment, in the centre of which lies a very distinct black speck ; in the left eye and near the macula a larger, bright-red, rhomboidal-shaped spot, also surrounded with pigment, and very sharply defined

against the background of the eye. In the right eye there are, additionally, numerous zig-zag-shaped patches of pigment lying near the optic papilla, and beneath the retinal vessels. In the left eye there are no traces of similar pigment spots. The ophthalmoscopic figure (upper drawing on plate viii.) represents as faithfully as possible the exact condition of the alterations in the fundus of the right eye.

The light-sense is reduced in the right eye to $\frac{1}{4}$ (photometer scale of 5 *mm.*) and in the left eye to $\frac{1}{16}$ (photometer scale of 15 *mm.*) of the normal amount. The patient's replies to my various questions, while testing him with Foerster's photometer, were very accurate. Color-sense is normal for both eyes, and remarkably well developed in comparison with the patient's education in other respects. I was unable to decide whether the field of vision was contracted or not, owing to the absence of a perimeter, nor could I detect the presence of a central scotoma (probable as it might have been from the appearances at the macula), owing to the lack of intelligence on the part of the patient.

We have before us therefore a case of injury from a stroke of lightning, which, without doing any extensive harm to the body, as in the case reported by Leber,[1] produced total blindness, which began to disappear within a week, rapidly improved up to a certain amount, at which it then remained stationary for several months. The shock produced neuro-retinitis with retinal hemorrhages, alterations at the macula, and slight opacification of the lens, which must have remained about the same for at least six months, as otherwise the patient would have complained of deterioration of vision, or of photophobia and dazzling. In other cases reported by Servais[2] and Leber (*l. c.*) the cataract became total or continued stationary at a condition which rendered vision extremely poor (Downar[3]). The characteristic changes at the yellow spot in both eyes remind us that in all of the four cases of dazzling of the retina by direct sunlight which

[1] Ueber Cataract und sonstige Augenaffectionen durch Blitzschlag, *v. Graefe's Archiv*, Band xxviii., Abth. 3, page 255.

[2] Observation de cataract produit par la foudre, *Recueil de mémoires de médecine, de chir., et de pharm.*, 1864, page 229.

[3] Veraenderungen im Auge nach einem Blitzschlag, ref. in *C. f. A.*, March, 1878, page 69.

Deutschmann has published[1] similar changes are recorded at the same locality, and that in the case of Downar (*l. c.*) the region of the macula was covered with hemorrhagic extravasations. Besides this, as in my case also, the neighborhood of the optic papilla was occupied by clusters of pigment which could not have originated in any other way than from previous hemorrhages in this vicinity. There does not seem to have been any paralysis, no matter how brief, of the levator muscle or swelling of the lids in the case of Zopko, either at the time of the stroke or later, although there were, at a subsequent stage, hyperæmia and hyperæsthesia of the conjunctiva, as described by Purtscher[2] in his case. Another interesting symptom is the extreme though unequal reduction of the sense of light in both eyes, but whether this may or may not account for the difference in the amount of vision in the eyes could not be accurately decided owing to lack of time at my disposal. Nevertheless, as positive testimony in favor of this question, we must remark that the eye in which the slightest objective alterations could be demonstrated showed the most extensive diminution of vision. The condition of the papillæ reminds us of that described in the case recently published by Pagenstecher.[3]

[1] Ueber die Blendung der Netzhaut durch directes Sonnenlicht, *v. Graefe's Archiv*, Band xxviii., Abth. 3, page 241.

[2] *v Graefe's Archiv*, Band xxix., Abth. 4, page 195.

[3] Injury of the Eye by Lightning, These ARCHIVES, xiii., page 26.

METASTATIC SARCOMA OF THE CHOROID.

By Dr. PFLÜGER, of Bern.

(*With a colored drawing, the lower one on plate viii.*)

Translated by Dr. J. A. Spalding, Portland, Maine.

INTRA-OCULAR metastatic tumors are so extremely rare that I venture to offer to the ARCHIVES a description of such a case, although I never saw it but once, and even then rather hastily.

Perls,[1] Hirschberg,[2] and Schoeler[3] have prescribed several cases illustrative of intra-ocular metastatic carcinoma, but there has so far been published, to my knowledge, but a single case of metastatic intra-ocular sarcoma, the one so accurately observed and carefully described by Dr. Schiess-Gemuseus, of Basel.[4]

May 4, 1882, I saw for the first and only time Miss H., æt. thirty, sent to me by a general practitioner for an opthalmoscopic examination.

The left eye is extremely amblyopic; S $\frac{1}{\infty}$. This reduction in vision has only been observed within the past six weeks. There are no pathological alterations anywhere in the fundus of the eye; no congestion-papilla, no optic neuritis, nor, on the other hand, any symptoms of optic atrophy. Tn.

The right eye has central S, $\frac{4}{6}$; field of vision exceedingly contracted to the right, the entire lateral half being absent. The limitation downward is somewhat less extensive. The ophthal-

[1] *Virchow's Archiv*, Band lvi., p. 437.

[2] *C. f. A.*, 1882, p. 376.

[3] *C. f. A.*, 1883, p. 236.

[4] *Graefe's Archiv*, Band xxv., Abth. 2.

moscope shows that the greater part of the medial half of the retina is elevated like a bladder and apparently covers the medial half of the papilla (see lower figure of plate viii.). The grayish-blue elevation is well defined against the rest of the fundus by a sharp curve, and is covered with delicate wavelets running up and down and with the dark, well-marked retinal vessels. Ophthalmoscopic measurements show that this elevation rises above the level of the rest of the retina from two, to three and a half millimetres at various localities. Toward the periphery of the retina the elevation gradually decreases in height, while it is most pronounced just above the lateral margin of the papilla.

The optic papilla, so far as it can be seen, is normal, with a small central funnel-shaped excavation, and is entirely free from any trace of inflammation or degeneration.

The pupils are of normal diameter and react perfectly. The sclera, so far as visible, is perfectly free from disease, and without a trace of suspicious pigmentation or any tumor-like formations. The position and mobility of the globe are normal. Tension is slightly diminished.

Metastatic melano-sarcoma having already been well defined in other parts of the body, there could be no doubt in this case of the proper diagnosis, which was given as metastatic sarcoma of the right choroid and probably of the cerebrum.

I append the history of the case as observed by the surgeons at the general hospital:

The parents, brothers, and sisters of the patient are all healthy. She had always been delicate, and suffered from indigestion and dyspepsia, but otherwise had never been afflicted with any serious illness. She was born with a flat, brownish speck, without hairs, over the right zygoma, to which she had given but little attention until about two years ago, when it began to itch so much that she kept continually scratching it. From this time the spot began to grow in size and to become very black. Since then, up to the time of her visit to the hospital, the increase in size had been steady, but without any pain.

September, 1881.—The patient felt a small gland at the angle of the right inferior maxillary bone, which gradually increased in size.

A physician whom she consulted soon after, advised her not to submit to extirpation of the tumor, which in November, 1881, had

grown to be as large as a hazel-nut, while around it lay several other small bluish nodules. A second gland near the former began to swell, while at New Year's, 1882, a third enlarged gland made its appearance near the two former. The same physician again insisted that an operation was inadvisable, despite the desire of the patient for removal of both the tumor and the glands, but he snared off with an elastic thread the greater part of the original tumor, an operation which was followed by profuse hemorrhage. Two days after the tumor fell off the patient noticed for the first time that she was losing the sight of her left eye. The position of the former tumor was soon filled up with the one which is now the largest. The patient has suffered from headaches since last autumn. A month ago they were extremely violent, recurring almost daily, but at present they are very slight.

Urine: No deposit, no albumen, no sugar; S. G., 1,020.

May 3, 1882.—Patient is very anæmic. There is not much change about the face, but when she is provoked to laugh a slight facial paralysis of the right side is quite noticeable. A row of grayish-blue spots about as large as a bean, slightly elevated and slightly elastic to the touch, lies in front of the right ear. The smallest spots and those which show no elevation resemble varicose veins, while the larger ones look just as if grains of powder had been sprinkled into the skin. Most of the elevations are movable with the overlying skin. Near the angle of the inferior maxillary bone lies a bunch of confluent glands, which are somewhat painful upon pressure. A few of these are as large as a chestnut. The skin is slightly adherent at the most prominent point, otherwise unchanged. The smaller glands are elastic, the larger ones hard, to the touch. One small gland is discoverable in the supra-clavicular fossa.

The thorax offers no abnormity. A small nodule is visible on the right side in the region of the lumbar vertebræ. No swollen glands can be felt in the axilla, groins, or anywhere upon the legs. The liver does not appear to be affected in any manner.

The patient was discharged as unfit for an operation. Her family physician sent me the following history subsequent to her discharge from the hospital:

A short time after her return from Bern, *the patient entirely lost the sight of her left eye, and within a fortnight later the right eye be-*

came totally blind. As time went on the melanotic nodules and glandular tumors attained an enormous size. The whole right side of the head as far as the scalp was covered with tumors as large as peas and walnuts, and bore a rough resemblance to a gigantic bunch of blue grapes. In the last few months of life a dark tumor made its appearance in the anterior chamber of the right eye, while numerous darkly pigmented deposits developed upon the sclera. The relatives were particularly struck by the extremely dark appearance of the eyes as life drew gradually to a close. The eyes did not appear to lose their position or mobility up to the day of the patient's death, which occurred about the first of August, 1883. Fourteen days before her death total paralysis ensued. An autopsy was refused.

Remarks.—This was a case of sarcoma in a young person developed from a congenital nævus in the region of the right parotid gland (as in the case of Schiess-Gemuseus), followed by secondary sarcoma of the glands, with metastasis into the skin of the back and head, into the right choroid, and probably into the cerebrum.

Three years and a few months intervened between the period when the congenital pigment-patch began to enlarge and the death of the patient.

The case of Schiess-Gemuseus could not be examined ophthalmoscopically on account of numerous vitreous opacities, yet the anatomical examination revealed that the intraocular metastasis had originated from the optic papilla. In our case, on the contrary, the choroid must be regarded as the starting-point of the metastasis.

The colored sketch (plate viii.) shows without a doubt that the optic papilla in the portion not rendered invisible by the retinal detachment was normal.

The retina at the time of the ophthalmoscopic examination was not involved in the tumor, but elevated like a bladder, in the very same way observed in primary sarcoma of the choroid.

The sclera at a later date was occupied externally by melanotic tumors.

The blindness of the left eye suggests metastasis into the cerebrum. The absolutely negative condition of the eye

when examined with the ophthalmoscope leaves no other explanation possible, and excludes the supposition that the disease had advanced directly along the chiasma. The cerebral metastasis may further be diagnosticated by the persistent headache, occasionally violent in the extreme, as well as by the total paralysis a fortnight before the death of the patient.

In 1875 I observed a similar propagation of blindness by cerebral metastasis in an old lady who was attacked with sarcoma of the uveal tract in an eye which had been rendered blind by traumatic agency. She had refused an enucleation previously, but desired to have it performed when after months of furious headache she became blind in the other eye, in which, however, there were no ophthalmoscopic alterations.

EXOPHTHALMUS:

ITS SYMPTOMATIC IMPORTANCE AS AN OCCASIONAL ATTENDANT OF HEMORRHAGIC FORMS OF RETINITIS, OCCURRING IN CONNECTION WITH ALTERED AND INCREASED GENERAL ARTERIAL PRESSURE, THE RESULT OF CARDIAC, RENAL, AND HEPATIC LESIONS.

By Dr. ROBERT SATTLER, Cincinnati, O.

IT can be admitted, that the causes of exophthalmus can in a large number of cases be readily determined. On analysis, they will be found to depend upon mechanical conditions, situated either within the orbit or in its immediate vicinity.

The various intra- and extra-orbital lesions of idiopathic or traumatic origin occasion in most instances a marked degree of protrusion or dislocation of the globe, proportional to the space occupied by the neoplasm, etc., or the products of an idiopathic inflammation or traumatic lesion within the cavity of the orbit, its walls, or its surroundings. It constitutes in most cases of this character, a conspicuous and pathognomonic symptom.

In other instances exophthalmus is a prominent symptom, but cannot be considered pathognomonic as in the first group. In exophthalmic goitre it is occasionally absent, slight, periodic, or transitory. It is conspicuous as a symptom in those interesting cases of so-called pulsating exophthalmus (rupture of the internal carotid within the cavernous sinus), and equally so in connection with that even more infrequent and obscure affection—thrombosis of the ophthalmic veins and intracranial sinuses.

In the latter group of cases, as also among the more infrequent forms of disease, such as bulging of the orbital plate of the frontal bone, the result of congenital or acquired hydrocephalus, cystoid disease of the ethmoid, lesions of the antrum, etc., dislocation of the globe, either slight or pronounced, is also due to mechanical influences.

In addition to these various causes there remain a number of recorded observations in which exophthalmus was a pronounced and conspicuous symptom, but with no explanation at all rational or satisfactory to account for its occurrence.

Under this group I purpose to mention three cases, among which this symptom appeared in connection with, and probably the result of, altered arterial pressure or tonus dependent upon pathological alterations in important organs, notably the kidneys and liver, associated with compensatory hypertrophy of the left ventricle and other changes of the circulatory system.

I append a brief report of the cases. It is possible that the dislocation of the globe was a mere coincidence; howsoever if it was, it is of sufficient interest and rarity to deserve mention.

In the first case, without a pronounced organic lesion, its occurrence was sudden and its duration short, followed by complete subsidence of the exophthalmus and restoration of function of the eyes.

In the second case, with fatal termination and the existence of pernicious anæmia, albuminuria, etc., it was marked, and persisted throughout the life of the patient.

In the third case its appearance was sudden and temporary and it existed only during the initial stage of the retinal lesion and disappeared after the lesion had made active progress. It differed from the exophthalmus which developed later on, which was due to hemorrhagic extravasation into the capsule of Tenon and into the retro-bulbar tissues. At this stage of the disease the case resembled the rare and interesting one reported by Wharton Jones, in the *British Medical News*, 1863.

Mechanical causes, in all three cases, could be excluded. Exophthalmic goitre could also be dismissed as a probable

cause in the first and third cases, and in the second no goitre or other specially distinctive symptom existed, and it was far more probable that a pernicious form of anæmia constituted the causative factor for all the symptoms.

Retinitis Hæmorrhagica—Active Cerebral Congestion—Great Impairment of Sight—Transitory Exophthalmus—Complete Restoration.

J. L., æt. fifty-six. Strong and muscular man. History of impaired vision, obscure nervous phenomena, mental depression, and emotional disturbance, paroxysms of active cerebral congestion (?), vertigo, etc., for two or three weeks. Ophthalmoscopic examination revealed typical picture of retinitis hæmorrhagica, with numerous characteristic large and small hemorrhagic extravasations in, on, and around disc. Functional ex.: V oc. sin. = 0.3; oc. dex., 0.5. Pronounced exophthalmus of both eyes; muscular movements unimpaired. Pupils active. Urine free from albumen. Heart-sounds normal, but second sound intensified; no bruit. Marked pulsation of carotids. Under rest, cardiac sedatives, etc., the exophthalmus gradually disappeared, and absorption of the retinal hemorrhages with restoration of almost normal vision resulted.

The patient has been repeatedly examined and no recurrence of the retinal lesion and of its uncommon associate-symptom, exophthalmus, has been observed.

Retinitis Hæmorrhagica seu Albuminurica—Hemorrhagic and Exudative Infiltration, Detachment of Retina—Grave Renal and Cardiac Lesions—Total Blindness—Marked Exophthalmus—Death.

Miss H., æt. twenty-two. Gradual impairment, commencing about three months ago, and resulting in complete suspension of vision within the last week.

She has always been amblyopic, due in part to macula corneæ, the result of keratitis phlyct. during childhood, and in part to a high degree of myopia. Her eyes have always been full, if not prominent, but within the last four weeks more pronounced prominence has been observed by the parents and friends.

Ophthal. ex. discloses most marked changes. Details of fundus not visible; grayish reflex in some parts, and complete absence in other parts. Anterior refractive media, with exception of opaci-

ties of cornea, transparent. Anterior portion of vitreous hazy and traversed by floating masses.

Funct. ex.: V = o, oc. amb. Marked exophthalmus of both eyes. Muscular movements of globe unimpaired; no retraction of upper lid. Pupils dilated and fixed.

The urine loaded with albumen. No œdema of lower extremities or of face. Action of heart forcible and tumultuous; second sound intensified; loud systolic bruit at base, over aortic orifice.

While under treatment for relief of the general symptoms, the marasmus and prostration became more and more pronounced. The blindness and the exophthalmic condition of the eyes, however, remained unchanged until the inevitable lethal termination occurred.

I am indebted to Dr. S. C. Ayers for the notes of this case.

The next case, in many respects, was phenomenal, both so far as the clinical manifestations and also so far as the negative results of the *post-mortem* examination were concerned.

Retinitis Hæmorrhagica seu Albuminurica.—Oc. Amb. Complete Abolition of Sight—Transitory Exophthalmus—Spontaneous Hemorrhagic Extravasations into Orbit, Capsule of Tenon, Conjunctiva, and Subcutaneous Tissue of Lids—Chronic Granular Nephritis—Death.

E. S., æt. fifty, discovered accidentally in Sept., '84, that his right eye was defective in vision, and immediately afterward came to me for advice.

Functional examination: V = 0.1, oc. dext. Tension and pupillary movements normal; marked prominence of eye; muscular movements undisturbed.

Ophth. exam. disclosed a typical form of hemorrhagic retinitis, but with absence of those characteristic alterations in macula-lutea region, so generally met with among albuminuric varieties.

The patient's previous history rendered the existence of morbus Brightii and also secondary lesions of the heart probable.

The urine, which was not perceptibly increased or diminished in quantity, contained albumen. Physical examination of the heart sounds revealed a forcible and diffused apex beat; on auscultation, a tumultuous and irregular action, intensified second sound, and a systolic bruit were heard.

Pulsation of the carotids very marked, and visible pulsation of the more superficial arteries of the face and head—facial, naso-ciliary, temporal, etc. Palpation discovered a rigid and atheromatous characteristic of these vessels.

Under rest, sedatives, ergotin, local depletion, etc., a temporary improvement of vision occurred, and also a recession of the prominent globe.

About four weeks afterward, impairment of vision, subjective glimmering, and distressing luminous appearances were noticed in the left eye. The vision of the right eye also became suddenly more impaired and was rapidly reduced to perception of light.

Ophthalmoscopic examination of the left eye, which had however been repeatedly resorted to before with negative developments, revealed extensive changes, hemorrhagic extravasations, œdema, and marked swelling of disc. Pupil dilated and fixed; marked exophthalmus; vision reduced to movements of the hand. Muscular excursions of globe undisturbed.

The treatment, consisting of local depletion, rest in bed, sedatives, etc., failed to exert the slightest favorable influence upon the disease, in either eye, after this period. In the left eye, after the exophthalmus had remained pronounced for three days, a gradual recession took place. The intra-ocular tension, which was increased from the onset, became more pronounced, and the eye presented a typical glaucomatous appearance. This, it seems, was due to hemorrhage into the iris, anterior chamber, and probably also the ciliary body.

Eserine, warm fomentations, etc., did not influence either the excessive tension or the excruciating pain, and paracentesis of the anterior chamber was performed under cocaine. Although the aqueous was evacuated, drop by drop, and with the greatest caution, rupture of numerous vessels of the iris immediately followed, so soon as the tension was reduced by the gradual flowing off of the aqueous. The operation, instead of affording relief, really aggravated the dangers for the relief of which it was performed.

In the course of the next two weeks, a gradual increase of all symptoms, both subjective and objective, took place. Light was completely abolished; exophthalmus had disappeared. Glaucomatous invasion had also occurred in the right eye. Suffering was intense.

About Nov. 15th, in spite of anodynes, etc., the excruciating

suffering persisted ; exophthalmus of the left eye suddenly developed. The muscular excursions were restricted, and the orbital tension was perceptibly increased. In addition, ecchymosis of the conjunctiva, and hemorrhage into the subconjunctival tissue, rendered the supposition of bleeding into the capsule of Tenon and cellular tissue of the orbit more than probable.

In the course of several weeks the exophthalmus and ecchymoses subsided, and about this time, Dec. 6, '84, the sclera of both eyes commenced to bulge, and a deformity, particularly in the left eye, developed, that would baffle description. The enlarged globe was conical in shape, and surmounted by large and small, most irregular prominences. No pain was referred to the eyes, but constant and excruciating suffering, uninfluenced by anodynes, was referred to the right parietal region.

The general arterial pressure remained increased, the action of the heart tumultuous and irregular. The urine was frequently free from albumen for several days.

From Jan. 1, '85, general prostration became more pronounced. Spontaneous rupture of one or the other of the numerous ectasiæ of the sclera, which seemed almost inevitable, did not occur, but toward the end of Jan. the pain, which until then had localized itself in the right parietal region, was suddenly transferred to his lower limbs. Examination revealed typical spots of purpura hæmorrhagica over both lower extremities, notably the right one. From this time on, marasmus and general prostration steadily increased, and the patient succumbed to his protracted suffering in March, '85. The left globe was so prominent and ectatic at and before the date of death, that the lids could not be closed over it. For several months no pain was referred to the eyes. Œdema of face or extremities never existed, and no evidences of uræmia manifested themselves. The action of the heart remained forcible and irregular to the last, and the systemic vessels retained the throbbing characteristic and strong impulse.

A FRAGMENT OF STEEL REMOVED FROM THE BACKGROUND OF THE EYE, WITH THE ELECTRO-MAGNET.

BY DR. GEO. T. STEVENS, NEW YORK.

On the evening of December 23, 1884, Mr. F. A., while opening an iron-bound cask, sent by a blow from his hammer a fragment of steel flying against the lower lid of the left eye. The shock of the stroke was felt, and at once there was confusion of vision. The gentleman called on me within an hour or two after the accident, when an examination was made by myself and Dr. Featherstonhaugh.

At the border of the lower lid, a little outward from the middle of its extent, was an abrasion of the skin with ecchymosis. A minute opening was seen at the conjunctival portion directly within, showing that the foreign body had evidently passed through the entire thickness of the lid. A corresponding point in the ocular conjunctiva exhibited also ecchymosis and a minute, penetrating wound, the latter situated 7 *mm.* below the border of the cornea and almost in the vertical meridian.

Using the ophthalmoscope, evidence at once appeared that a foreign body had penetrated the globe. Upon closer examination the following conditions were found :

There was a stellate laceration of the posterior lens-capsule, external to the centre of the lens and a little less than half the distance between the centre and periphery. Five or six lines radiated from a common centre, and below this a portion of the capsule appeared to be detached from the lens.

Beyond and in the retinal plane a long, straight, dark line, very conspicuous and having a diameter equal to one of the principal arteries, was seen. It extended from a point above the macula higher than the upper border of the optic disc, traversed the

region of the macula, and extended downward toward the lowest part of the retina, where it seemed to be lost in a somewhat extensive hemorrhagic extravasation. Owing to the lacerations of the capsule, and especially to the detached portion, it was impossible to trace the line in its lower part after it passed into the extravasation.

In the upper part of this extravasation appeared a small, feebly, lustrous, angular point, which was, doubtless, at least a portion of the foreign body. The confusion of the ophthalmoscopic image in the lower part of the field already mentioned, rendered it impossible to trace a direct relation between this point and the mark so conspicuously seen traversing the region of the macula. This long streak was at once suggestive of a foreign body, but it was destitute of the metallic lustre seen at the point below, yet the fact that its lower portion was somewhat advanced in front of the general plane of the retina, was shown by the circumstance that that portion could best be seen by a rather strong convex lens behind the ophthalmoscope, while in its main course it could be best seen without the lens.

The subsequent history of the case removed all doubt as to the nature of the conspicuous streak, and proved that it was the principal portion of the foreign body veiled by the overlying retina ; while the lower and, as it proved, the broader extremity, remaining at the vitreous side, exhibited in the midst of the hemorrhagic space a faint metallic lustre.

In fact, the principal portion of the foreign body had lodged between the choroid and retina, and extended from the lowest point in the equator through the point of the macula and above the upper border of the disc.

The gentleman was seen on the following morning, when all the observations of the preceding evening were confirmed. The gravity of the accident was pointed out to him and he was advised to subject himself to an operation for the removal of the foreign body, with the assurance that even if the foreign body should be successfully removed cataract must follow. At my request he at once consulted Dr. H. Knapp, who was in full accord with me in the view that an immediate attempt should be made to remove the foreign substance.

Accordingly, on the same day, Dr. Knapp and Dr. Featherstonhaugh being present and kindly assisting, the operation was performed as follows :

A solution of cocaine having been applied, a narrow blade was thrust directly through the conjunctiva and sclera into the globe of the eye, below the cornea and a little to the temporal side, then by a sweeping movement as the blade was withdrawn the opening was extended downward and outward. The wound thus made was 5 *mm.* in extent. The needle of a very strong electro-magnet was then introduced within the globe, its point being directed as accurately as possible toward the position in which the lustrous substance had been observed. Withdrawing the instrument slowly and with much care, we had the great satisfaction of seeing attached to its extreme point a long needle-shaped spicula of steel. A single drop of vitreous escaped.

The lips of the wound closed very perfectly, and no precaution beyond the use of a slight compress was taken to insure union.

On the following day the capsular and lenticular opacities had extended considerably, yet not enough to prevent an inspection by the aid of the ophthalmoscope, when it was discovered that the dark line across the retina had disappeared.

The patient remained in his room two days, no dressing or special care being enjoined. The progress was in the highest degree satisfactory, the wound healing so quickly, and other appearances of injury disappearing so rapidly, that within a week after the operation there was no very noticeable evidence of injury to the eye.

The cataractous condition advanced slowly, and during several days permitted not very extensive yet quite satisfactory inspections of the fundus of the eye by the ophthalmoscope. These examinations showed that no marked reaction occurred in the retina, and the entire absence of the conspicuous line caused by the presence of the spicula of steel beneath the retina.

During the months of January and February the amount of vision permitted by the cataract was enough to be rather annoying than otherwise, but by the end of March the cataractous condition was sufficiently established to practically exclude the eye from any special participation in the visual act.

The fragment of steel was 5 *mm.* in length, and may be best compared in general outline to a similar length broken from the point of a No. 7 sewing needle, but having sharp angles.

In a successful case of removal of steel from the retina reported by me in *Transactions of American Ophthalmological Society*, 1875 (see also ARCHIVES OF OPHTHAL-

MOLOGY, vol. vii., page 333), and which is the only other instance of removal of a foreign body from the retina which has come to my observation, hemorrhage followed the operation on the seventeenth day, succeeded by gradually improving vision. In this instance no complicating circumstance has succeeded as the result of the operation.

Two especially interesting and unusual phenomena in this case deserve attention.

1st. The position of the foreign body, rendering the diagnosis of its exact nature obscure. In its main course it was beneath the retina, and hence exhibited no metallic appearance. The extremity which remained on the vitreous side was very small, was surrounded by hemorrhagic extravasation, and, owing to the condition of the capsule, badly seen.

2d. A curious question arises in regard to the manner in which the capsule was lacerated.

It seems beyond question that the course of the spicula was very direct through the lid, the sclera, the vitreous, and beneath the retina. In this course it would have been impossible for it to have come in contact with the capsule at the seat of the injury. Again, the capsule was not scratched nor the substance of the lens injured, as would have been the case had the needle of steel rebounded against it.

Only one explanation occurs to me as consistent with all the circumstances: *laceration of the capsule as the result of sudden tension.*

At the instant when the shock of injury was received, the eye was strongly accommodated, the ciliary muscle being in a state of decided tension. The patient was thirty-eight years of age, and the lens had not all the flexibility of youth. The shock caused an instantaneous relaxation of the accommodation, and a correspondingly instantaneous tension of the capsule; the lens being slow to yield, the tension was too sudden and too great, and the capsule gave way in the stellate fracture described and with a small flap entirely detached.

EXAMINATION OF THE REFRACTION AND BASAL LINE OF THE EYES, AND OF THE DYNAMIC RELATIONS OF THE LATERAL MUSCLES IN GIRLS FROM FIVE TO EIGHTEEN YEARS OF AGE.*

By Dr. OTTO BESELIN, Heidelberg.

Translated by Dr. J. A. Spalding, Portland, Maine.

SIX years ago, 250 school-girls in Heidelberg were examined with the ophthalmoscope, and their refraction, vision, pupil-distance, color-vision, and (by v. Graefe's method of equilibration) the dynamic relation of their lateral ocular muscles determined.

Four years later the examination was repeated, but this time with 375 girls.

The results discovered in 1879 were demonstrated in an academical thesis, but never printed. I have, however, incorporated them into this paper, because I thought it of interest to compare the former results with the present, especially in the case of the 61 girls who happened to be included in both examinations. I have also had at my disposal numerous notes by Prof. Becker, exhibiting the maxima of abduction and adduction, as well as the results of his investigations into v. Graefe's law of equilibrium in 256 persons, together with the pupil-distance in 545 people in comparison with their age and refraction.

So many examinations of the refraction of the eyes of school-children have been made of late years that our figures of course show nothing new, and can only serve to confirm and amplify the results already obtained by numerous competent observers. But inasmuch as our examina-

tion of the dynamic relations of the lateral muscles opens up a hitherto unexplored field of investigation, we feel that we have a right to call special attention to the same, and all the more urgently since, so far as I know, no similar investigations have ever been made amongst subjects of so youthful an age. Furthermore, since eyes whose muscles are apparently not affected often reveal important variations when subjected to an examination, it is possible that the study of this especial point from conditions which are nearly if not absolutely normal, may offer us a key to symptoms which in other persons are excessively increased and may therefore be strictly regarded as pathological.

The refraction was measured, independently, with glasses held before the eye, and with the ophthalmoscope. Whenever these results differed, the first test was regarded as the best in cases of astigmatism only,[1] while in all the others the ophthalmoscope was considered the most accurate test, because many errors which must have crept in when the patients were tested with glasses, from excessive tension of the accommodation, could be easily avoided in the examination with the ophthalmoscope. Owing to these precautions M was found to a less percentage, H proved to exist more frequently, and even apparent E to be H.

We have included slight degrees of H, M, and As under E when of less amount than 1 D, a step which appears justifiable when we reflect that, strictly speaking, there is no such thing as a perfectly emmetropic eye, because a perfectly symmetrical cornea does not exist. M and H of $\frac{1}{2}$ D, or even of 1 D, are scarcely perceptible to those affected, and rarely demand correction with lenses. Such a step of course reduces our percentages of M and H, yet in taking it we shall obtain a more accurate idea of the number of eyes which correctly speaking require a compensating glass, and this is one of the chief aims of our examinations and tests.

We did not pay much attention to different degrees of the same variety of refraction in both eyes, but those cases with more than 1 D of H on the one side, and of M on the other, are classified separately. The same has been done

[1] The OS test of astigmatism is more reliable than the functional, which brings out astigmatism only so far as it is corrigible.—(H. K.)

with the cases of M or H in one eye, and E in the other, because in a practical point of view it appeared necessary that these persons should not be classified with those who were ametropic in both eyes.

Our results[1] vary somewhat from those of other observers, because we have examined on different principles. Many have collected the slightest degrees of M, and of course in this way obtained higher percentages. Others, again, have unconsciously passed over many cases of H, and examined the refraction of such cases only as showed decreased vision. In this way their percentage of H is very small in comparison with ours. Again, there is a great deal of difference between the examination of boys from nine to nineteen years of age, and that of girls from five to eighteen. Some observers, finally, have examined every single case with the ophthalmoscope, and found larger percentages of H than we, because they included all degrees of H.

V. Reuss,[2] amongst others, examined the refraction of all his cases with the ophthalmoscope, but he too reckons even the slightest degrees of H. In his paper we find the refraction obtained with tests by lenses compared with that obtained with the ophthalmoscope, and from his tables we see to what extensive variations the two methods may give rise. Thus, as determined by lenses, M showed 55 per cent., H 10 per cent.; with the ophthalmoscope, M 37 per cent, H 28 per cent. Hoffman's examinations[3] with the ophthalmoscope yield about the same results.

It is a well established fact, and one that does not at present need any additional proof, that heredity exerts a great influence in the production of M. This we see every day before us. Yet Hermann Cohn has lately objected that, although a hereditary predisposition is possible, and even probable, we have not yet demonstrated that it exists in the generally assumed manner. Cohn has only found M in about three per cent. of one at least of the parents of short-sighted children that he had previously examined, figures upon

[1] Four extensive tables have been suppressed in this translation.—ED.

[2] Beitraege zur Kenntniss der Refractionsveraenderungen im jugendlichen Alter. *V. Graefe's Archiv*, Band xxii., Abth. 1, pag. 231.

[3] *Klin. M. f. A.*, Band ix., pag. 269.

which he lays but little value, because they depend entirely upon random questions put to the children themselves. The most convincing way to discover the part played by heredity would be to examine thousands of children as well as their parents, an investigation which will hardly be undertaken in our days, owing to its enormous attending difficulties. Still, I will not hesitate at this point to mention the results which I have obtained from investigating the sight of the parents of thirty myopic children, viz.: one or both of the parents myopic 18 times, neither of the parents myopic (but twice brothers or sisters myopic) 6 times; no certainty whether myopic or not, 6 times. In other words, in 60 per cent. of 30 children the parents were, one or both, myopic.[1]

Amongst the girls whom we examined, 61 had passed through the same ordeal four years before, and the notes then made were compared with those of the latter examination. Here we find a considerable number of variations in refraction during this long interval; cases of H becoming less marked or even E, cases of M appearing in eyes which had previously showed E, and finally cases of M increasing from lower degrees of the same refraction. We did not find any changes in a reverse order. *In making this comparison, alterations of refraction of* 0.5 *D are not included, because there may have been unavoidable errors at either examination.* Nor is E reckoned as in a former part of this paper, but as it seemed proper to include variations of 1 D only, a decrease of H and M of this amount is here included. Besides this, an alteration of refraction in one eye only is also counted.

TABLE I.

1	E, as before.	9
2	H, " "	14
3	M, " "	4
4	H, decreased.	1
5	H, changed to E.	12
6	H, " " M.	4
7	E, " " M.	7
8	M, increased.	3

[1] Inquiries into hereditary tendency should include the condition not only of parents, but of uncles and aunts, grandparents, granduncles, and grand-aunts.—H. K.

The most noticeable variation was a case which changed from E to M 4.5 D, and a second with M 10 D, which resulted four years later in M 16–18 D in the right eye and M 14 D in the left.

The previous table demonstrates that out of 61 girls 27 showed a variation of refraction of more than 0.5 D within a space of only four years, a number which must remain very large even if we withdraw a few of the cases in which the first or second examination may possibly have been imperfectly performed. The vision, however, of these girls does not appear to have changed very much after correcting-glasses were prescribed.

Careful examination of our next tables[1] shows that at the first examination fifteen per cent. of the girls had defective vision, and at the second examination fourteen per cent. If we arrange these cases according to the different conditions of refraction, we find that the proportion of reduced vision increases in the following order: E, H, M, As; for while the E eyes in 1879 showed six per cent. of defective vision and five per cent. in 1883, and while the H eyes showed of the same thirteen per cent. in 1879 and fourteen per cent. in 1883, the percentage increases in M to thirty-seven per cent. in 1879 and twenty-nine per cent. in 1883, and finally in As to seventy-seven and even one hundred per cent. of reduced vision. Of myopes, therefore, fully one third lack a normal amount of vision. The sight of the As eyes was tested while holding in front of them, in a frame, the most perfectly correcting cylindrical glasses. Four of these girls showed a great decrease of vision and of a varying amount in each eye.

Erismann found the same percentage (fourteen) of diminished acuteness of sight in 4,358 children, and he remarks that "this amount of defective sight may be regarded as about the normal average for people who pass their lives in cities."

We undertook careful measurements of the basal line of the eyes in order to obtain its average length at various ages, and to discover if there were any relation between the same

[1] Two tables exhibiting the vision in 700 cases are here omitted.—Ed.

and the various conditions of refraction. We employed for this purpose Weiss-Landolt's double-ruler, the children fixing, over it, a given point at a proper distance.

Our results are shown in

TABLE II.

Pupil-distance in millimetres of 246 girls, in 1879.[1]

Refraction.	Age 8-10.	Age 11-13.	Age 14-16.	Age 17-18.	Average (above); Total (below).
Em	55	57.6	59.1	58.7	57.1
	57	63	44	4	168
H	53.7	55.6	57.9	—	55.1
	9	19	9	—	37
M	57.0	57.2	58.9	60	58.1
	3	10	15	1	29
As	57	58.1	61	—	58.2
	2	6	1	—	9
1 Eye H }	55	51	—	—	53.6
1 Eye M }	2	1	—	—	3
Average distance; }	54.9	57.1	58.9	59	57.2
Total }	73	99	69	5	246

TABLE III.

Pupil-distance in millimetres of 358 girls, in 1883.

Refraction.	Age 5-7.	Age 8-10.	Age 11-13.	Age 14-16.	Age 17-19.	Average (above); Total (below).
Em	54.7	55.9	57.2	60.2	63.7	57.2
	31	72	80	48	4	235
H	55.1	56.5	57.8	58.0	—	56.7
	16	32	24	3	—	75
M	56.0	56.0	58.3	59.6	59	58.4
	1	5	12	13	2	33
As	54.0	58.3	60.3	60.6	56.5	59.0
	1	3	3	5	2	14
1 Eye H }	—	—	—	61.0	—	61.0
1 Eye M }	—	—	—	1	—	1
Average distance; }	54.8	56.2	57.5	60.1	60.8	57.3
Total }	49	112	119	70	8	358

[1] The upper figures in this and following tables indicate the average distance in *mm.;* the lower ones, the number of girls examined.

TABLE IV.

Pupil-distance, according to the sex and age, of 545 individuals. (*Prof. Becker.*)

Age.	—10	—15	—20	—100
Men } 298 }	53.9 15	56.1 38	58.9 49	60.1 196
Women } 247 }	51.2 12	55.1 25	57.8 36	57.5 174

TABLE V.

Pupil-distance of 545 persons, arranged according to sex and refraction.

Refraction.	E.	H.	M.
Men } 298 }	60.4 59	58.1 97	59.6 122
Women } 247 }	60.4 38	56.9 135	58.3 74

TABLE VI.

Pupil-distance of 545 persons, arranged under myopia and hypermetropia according to age.

Age.	—10	—15	—20	—100
M	53.2 8	57.2 28	59.1 40	60.2 140
H	52.5 17	54.1 24	58.1 25	57.5 166

The five preceding tables show that the length of the basal line increases with great regularity with advancing of years; from five to sixteen years of age about 5.3 *mm.*, and from eight to sixteen years about 4.0 *mm.*, or on an average a yearly increase of 0.5 *mm.* After the sixteenth year the increase is slight. In girls the length of the basal line attains its maximum at twenty, and indeed shows but slight increase after the sixteenth year, the tables demonstrating that the pupil-distance is nearly the same in girls of from sixteen to twenty years of age as in women over twenty.

The length of this line in men and boys is, as was to be expected, greater than in girls and women, and moreover it does not reach a maximum at the age of twenty, but continues slowly to increase with the growth of the person concerned, a fact which coincides with the general laws of the growth of the two sexes.

In comparing the pupil-distance in the various refractive conditions, we see that (with exception of As, which furnishes remarkably high values) the greatest pupil-distance is found almost invariably in E. In M it is generally less than in E; in a few instances only is it greater. H shows without exception much smaller figures than M, a fact which is especially marked in Table V., although in Table III., where the average of larger numbers is given, there is an apparently greater pupil-distance (by 0.4 to 0.6 *mm.*) in H than in E. Nevertheless, in this same table the *average* pupil-distance in H is a trifle (0.5 *mm.*) shorter than in E (56.7 to 57.2). But in considering this fact we must not forget that H is chiefly marked in the youngest children, so that from the average size of the head, and average growth, it ought naturally to exhibit smaller figures, than E, which is more evenly distributed amongst all the classes. In an opposite sense the same may be said of M; the only correct measurements to compare are those of children of the same age.

TABLE VII.

Increase of the pupil-distance in 61 girls during the space of four years.

Age.	12	13	14	15	16	17	18	Average Increase. Total.
E	6	4.3	5.3	5.4	2	4	2.5	4.9
	1	3	24	10	2	2	2	44
H	—	6	2	—	—	—	—	4
	—	1	1	—	—	—	—	2
M	—	6	4	5.3	3	2	2	4.1
	—	1	3	3	1	1	1	10
As	—	6	7	—	6	—	—	6.5
	—	1	2	—	1	—	—	4
1 Eye H	—	—	—	4	—	—	—	4
1 Eye M	—	—	—	1	—	—	—	1
Average	6	5.2	5.2	5.3	3.2	3.3	2.3	4.8
Total	1	6	30	14	4	3	3	61

The preceding table (VII.) shows the average increase of the pupil-distance in 61 girls, arranged according to their age and refraction, in order to establish, if possible by so meagre statistics, the age at which this increase chiefly takes place, and to discover whether the increase is more or less marked in the various degrees of refraction.

Inasmuch as this series contained only 4 H, we cannot lay any stress upon the influence of this refractive condition upon the increase of the pupil-distance. The 44 E show an average increase of 4.9 *mm.*, the 10 M of only 4.1 *mm.* The increase was most noticeable in the 4 girls with As, in two of which it amounted to 6 *mm.*, in the others to 7 *mm.* The increase is also most chiefly marked up to the age of fifteen, and amounted up to this age to more than 5 *mm.*; thence onward the increase was slighter. At the age of eighteen it is only one half as large as before, a result which coincides with the assertion previously made, *that the pupil-distance of girls reaches its maximum at about the age of* eighteen.

Erismann has published tables which in form correspond with ours, yet our figures do not agree with his. Nor is this to be expected, since there can be no question that the average length of the basal line varies just as much in different countries as the average height of their inhabitants. The great question, then, to establish is not so much the absolute length of this line, as its relative proportion; and, on the whole, the agreements are rather remarkable.

The same author gives the *average yearly increase as about* 0.5 *mm.*, but his figures do not exhibit such marked uniformity as ours. For, girls above fifteen years of age are not represented in his tables at all, while men show an increase up to their twenty-second year, but only of 0.1 *mm.* yearly after twenty. The H have a less average than the E and M, while on the contrary, and in opposition to our figures, his M have a longer basal line than the E, with but one or two trifling exceptions. Bjeloff,[1] however, coincides with us, asserting that the basal line in M is longer than in H and shorter than in E.

[1] Material zur Lehre von den Bedingungen des dynamischen Gleichgewichts, etc. Ref.: *C. f. A.*, Band v., p. 478.

Although Mannhardt[1] regards a long pupil-distance as characteristic of M, and refers it to the great disposition of myopes to insufficiency of the interni, and even thinks that there is a proportional relationship between these two conditions, our tables and those of Bjeloff throw considerable doubt upon this assertion, while those of Erismann render it especially improbable, because in the latter tables the difference between the pupil-distance of emmetropes and myopes is exceedingly slight.

The dynamic relations of the ocular muscles have never yet been carefully investigated. Many accurate examinations have been made of evident pathological alterations in the muscles, much has been written and published concerning strabismus and the insufficiency of the internal recti in M, but inasmuch as there is a great diversity of opinion concerning the etiology of these diseases, **it seemed eminently proper to undertake new investigations into the muscular relations of eyes that, so far as we could ascertain, were perfectly healthy.** Becker had already made similar observations, had tested many eyes according to v. Graefe's method of equilibration, and decided upon their maxima of abduction and adduction. For these and other reasons we were induced to undertake similar investigations while examining the vision of these school-girls. The experiments were made in the usual way, except that a rose-tinted prism was employed. A burning candle was first fixed at a distance of five metres, and if the double images did not stand directly above one another, the prism needed for correction was then employed and its angle noted. The same process was followed with a white dot on a black background, held at 30 *cm.* from the eyes. *For the sake of abbreviation: Far, Near, Equilibrium, Convergence, Divergence, will in the rest of the paper be indicated only by their initials* F, N, Eq, C, D.

Table VIII. shows the cases, arranged according to their refraction: first those with Eq; then those with preponderance of the externi, D; followed by those with preponder-

[1] Muskulære Asthenopie und Myopie.—*V. Graefe's Archiv*, Band xvii., Abth. 2, p. 69.

ance of the interni, C; and finally two rows in which D for F or N was united with C for the opposite distance N or F.

We examined 233 girls in 1879, 297 in 1883, but in the latter we have not included those examined four years before, in order that the same 61 might not be counted twice. Besides these we have included 256 persons examined previously by Dr. Becker, most of whom were out-patients in the hospital, a fact which may account for the preponderance of M, and the paucity of E. Cases of manifest strabismus are not included. We have consequently examined the following conditions of refraction:

	E	H	M		
1879	168	37	28	=	233
1883	195	79	23	=	297
Prof. Becker	50	88	118	=	256
	413	204	169	=	786

And these may be subdivided according to Table VIII.

We notice first of all how infrequently we meet with that which is regarded as the normal condition in which E exists for both F and N, or in which the elasticity of the abductors of the eyeball equals that of the adductors, a condition found in only 37 per cent. in E, 29 per cent. in H, 10 per cent. in M. We also see the preponderance of the externi over the interni in groups 2 to 6, and in groups 7 to 11 the opposite condition. Divergence is consequently much more frequent than convergence under each sort of refraction: 42 per cent. in E, 37 per cent. in H, and 59 per cent. in M. In cases of F and N with equal D, or of greater D for N than for F (groups 2 and 5), which are of more practical interest, the preponderance of M is still more noticeable.

In the same way, in groups 7 to 11 showing preponderance of the interni, we find for E 10 per cent., for H 28, for M 15, or, as was to be expected, a preponderance of C for H. Indeed the figures for H are greater than those of E and M united. The M would be still smaller if only the figures of the lower schools had been counted in, for in these with 51 M there was only one case of C, while in 118 older scholars there were 25 cases.

TABLE VIII.

RESULTS OF V. GRAEFE'S EQUILIBRATION TEST IN 786 PERSONS.

	Em			H			M			Total.					
										Em		H		M	
	1879.	1883.	Becker.	1879.	1883.	Becker.	1879.	1883.	Becker.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
1. Equilibrium { F. N.	47	93	15	10	22	27	4	8	6	155	37	59	28.9	18	10.6
2. Equal D. { F. N.	3	6	3	0	1	1	1	1	11	12	2.9	2	1.	13	7.7
3. Far Eq. Near D.	46	36	6	7	17	11	9	6	13	88	21.1	35	17.1	28	16.6
4. Far D. Near Eq.	4	9	6	1	4	6	0	1	5	19	4.6	11	5.4	6	3.5
5. { Far D. Near greater D.	28	22	6	6	15	7	8	6	39	56	13 5	28	13.7	53	31.4
6. Far D. Near less D.	0	1	0	0	1	0	0	0	0	1	0.2	1	0.5	0	0
7. { Far } Equal { Near } C.	6	2	0	1	5	6	0	0	0	8	1.9	12	5.9	0	0
8. Far Eq. Near C.	2	3	3	1	2	2	0	0	2	8	1.9	5	2.4	2	1.2
9. Far C. Near Eq.	5	9	7	4	9	18	0	0	18	21	5.1	31	15.4	18	10.7
10. { Far C. Near greater C.	2	1	1	1	1	5	0	0	2	4	0.9	7	3.8	2	1.2
11. Far C. Near less C.	1	3	1	2	1	0	0	1	3	5	1.0	3	1.4	4	2.4
12. Far D. Near C.	1	0	1	2	0	2	0	0	1	2	0.4	4	2.	1	0.6
13. Far C. Near D.	23	10	1	2	1	3	6	0	18	34	8.2	6	2.9	24	14.2
Total	168	195	50	37	79	88	28	23	118	413	100	204	100	169	100

F D, N C had only 2 E, 4 H, 1 M, while on the contrary F C, N D showed 14 per cent. in M, and about 3 in H.

To conclude:

(1) The equilibrium of the lateral muscles of the eyes is frequently disturbed in all conditions of refraction, *and not only in adults but in children of only five years of age.*

(2) The externi preponderate in all sorts of refraction in more than one third of all the cases, and in M in more than one half.

(3) The interni preponderate especially in H, in about 33 per cent. of all the cases.

Sixty-one of the girls were examined at four years' intervals, and it was found that the equilibrium of thirty-nine had not changed at all, twenty-three remaining either D or C as before, while sixteen showed unaltered Eq both for F and N.

There was but one case each in which Eq was changed into D, and *vice versa*:

F C 5°, N D 12° was changed into F D 2°, N D 3°

F D 3°, N D 3° was changed into F C 2°, N D 6°

Hence, to the above conclusions we can add: (4) Alterations of the dynamic relations are frequent in young people and may assume various types.

It is generally asserted that in youth the interni frequently preponderate, then yield as age increases, while finally the externi preponderate. Observations after squint-operations are well known. Thus, after convergent strabismus, we do not at once obtain increased preponderance of the externi, and Schweigger concludes, after seeing spontaneous cure of convergent squint, that the mutual relations of the muscles must have as spontaneously altered.

It would be agreeable at this point to discover how those cases act in which, at the same time, the refraction has altered. Thus, where M has developed or increased, has D developed from C or from Eq, or has it even increased from a previously slight D? Unfortunately, pertinent cases are too few in number for satisfactory statistics, yet we may venture at this point to cite some figures.

In twenty-seven cases of elongation of the globe, D increased very noticeably or developed in six cases, D remained as before in one case, Eq in two cases; C originated from Eq in two cases. I would, however, call attention to the fact, that although M may increase very noticeably, yet the interni do not always yield. Thus, in a case in which M had increased from ten Diop. in each eye to eighteen right eye and to fourteen left eye, Eq had continued as before. In another case D returned to Eq, although EM had been transformed into four Diop. M right eye, and three Diop. M left eye. While, finally, in fourteen cases in which the same amount of H had continued, C had increased from its original condition three times, D had decreased the same; in one case each D increased and C decreased.

It is asserted by some authors that the faulty action of the antagonistic muscles is frequently congenital. But it is almost impossible to bring any proof on this point, because it is so difficult to test the new-born. All that we can say is, that when such disturbances are early discovered, and when we can exclude all inflammatory, functional, or nutritive disturbances, we have the right to regard them as congenital. More accurate proof than this is impossible. But since we have carried our investigations back to the earliest possible age and have found the same abnormities as in adults, it is probable that these are congenital.

Bjeloff examined 216 persons in order to test the various refractive conditions for *latent* D and C. He arranged the tests for the same distance as we have done, the ametropes were tested both with and without correction, and his results in EM and uncorrected ametropia coincide with ours.

What now is the aim of these equilibrium experiments? V. Graefe tells us that the act of holding prisms before the eye causes double images, which the eyes endeavor to fuse into one when the two images lie horizontally to one another. But if one image lies above the other, the eyes do not endeavor, in the case of too strong a prism, to fuse the images, but yield to the elastic tension of their muscles. If the tension of the adductors equals that of the abductors we have dynamic equilibrium.

Alfred Graefe[1] doubts if the eyes always assume their position of rest in this experiment. He has seen cases in which the deviation thus produced was smaller than the real amount; but he never saw it greater. Still he acknowledges that wherever we thus discover this deviation the disturbance is not simulated but is genuine. In some cases it may be even more extensive than the experiment shows. It is, nevertheless, generally assumed that in a pair of eyes which we cause to look at a distance, and in which we then, with this experiment, find one image directly over the other, the sum of the elastic forces of the interni is equal to that of the externi, while in any other case this equilibrium is disturbed. But we are less concerned with the exact amount of this deviation, than with the fact that it really exists and indicates the preponderance of one group of muscles. It is a matter of indifference whether we here assume that (in vision to a distance) the motor nerve is entirely free from irritation, or whether, as Brondgeest has demonstrated on the muscles of decapitated frogs, a reflex irritation reaches the muscles through their own nerves. The latter is probable, and Hering believes in a continuous tonus dependent upon a steady innervation. And, at all events, if there is any innervation, its action must be equally distributed to both groups of muscles if equilibrium is present.

If we next consider the manner in which the various combinations (Table VIII.) originate, we have to separate two things: 1. During vision at a distance with a prism held before the eyes, accommodation is relaxed as much as possible, and the external ocular muscles are either innervated not at all or all alike. Six metres represent infinite distance, and can without error be substituted for the same. The visual lines can then be parallel or intersect one another in front of or behind the eyes. Eq, C, D. 2. If we then attempt the same experiment while fixing an object close at hand, or if, in other words, we accommodate for a point at a finite distance, the innervation of the externi and interni is altered. This innervation varies in every one: now the interni predominate, now the externi; or there may be no

[1] Graefe-Saemisch: Handbuch, Band vi., Abth. 4, p. 194.

alteration at all in the position of the eye, in which case, however, the innervation has not ceased, but is equally distributed amongst both groups.

If now, bearing these facts in mind, we examine the various cases, we find that with Eq for both F and N the innervation stands in a corresponding relation to the accommodation at every given distance.

In the second group the visual axes when prolonged backward cross one another behind the eye (D). The various subdivisions in this group depend upon the innervation caused by the act of accommodation, resulting now in Eq, and then again in D. The same happens under group three.

There is something curious about those cases in which with D for F we see C for N, and inversely. In these, Eq exists only for a determined distance. If the accommodation is arranged for this point the visual axes here unite. If the patient looks at a point farther distant D or C appears, or *vice versa.* Thus, in my own eyes: F, C 3°, for N, D 6°. By altering the distance of the object fixed, I find Eq for a distance of about one *m.*

We see, therefore: 1, *that the relation of the group of abductors and adductors in the position of rest varies largely;* 2, *that the alteration of the dynamic relations of the two groups ensuing upon accommodation is subjected to many individual variations.*

The disputed point in Donders' theory on the origin of convergent squint in H is this, that the relation between accommodation and convergence in H and M must be the same as in E. Donders says that the hypermetrope in fixing a near object is inclined to converge more strongly, since an increased convergence relieves his difficulty in accommodating. But since, so long as binocular single vision exists, the degree of convergence is decided by the distance of the object fixed, the hypermetrope occasionally renounces binocular single vision and converges more strongly, in order to accommodate with greater ease and to continue the act of accommodation for a longer period.

Schweigger [1] assumes that the relation between accommo-

[1] Klin.: Untersuchungen ueber das Schielen, Berlin, 1881.

dation and C in H is different from that in E, in point of fact a better one, for it is learned by experience, it is not congenital, and consequently must be developed differently in H than in E. He also thinks that we must look about for other causes of strabismus—*e. g.*, in a disturbance in the relations of the ocular muscles. If the interni predominate we have convergent strabismus, in other cases divergent; H being disposed to convergent squint in the same way as M to divergent.

Inasmuch as the above-mentioned variations occur fre quently in H, we have some doubt in agreeing with Donders that the accommodation is equally difficult for all hypermetropes of the same degree with equal convergence. For myself, I am disposed to believe that we ought to separate the various cases of H with relation to their disposition to convergent squint, according as the relation of the externi to the interni varies in different hypermetropes. If we, *e. g.*, take two cases of H, both with Eq for distance, yet the first has Eq for N while the other has well-marked C for N. After removing the prism, the first one will not need any exertion to obtain binocular fixation, for the visual axes already intersect at the fixed point. In this case, also, there will be no difference between the hypermetrope and an emmetrope with similar relations of the muscles, provided the muscle of accommodation acts normally, something that we regard as unconditional in a young person.

In the second case, the prism is removed, whereupon the externi must be innervated in order to bring the eyes into a correct position; and yet this very innervation disturbs the accommodation. If, on the contrary, the accommodation is sufficient, the eyes have a tendency to assume too convergent a position. In such cases, consequently, difficult accommodation must contribute directly to the origin of the convergent squint, as it really does in H. But the accommodation may be able to participate in this work even in emmetropes, and possibly in slight degrees of M. Nevertheless it is not always necessary that the accommodation should play a part. For the disturbance of equilibrium can from the first be so considerable, that even without the

co-ordination of accommodation the eyes are forced to assume a squinting position.

Finally, Table VIII. also shows that the preponderance of the interni is more frequently discovered in H than in other conditions of refraction. Frequent mention is made of the fact that H inclines to preponderance of the interni even without accommodation, but I never yet knew that this assertion had been at all supported by statistics.

Although the disturbed relations of the muscles are not regarded by Donders' followers as the primary cause of the origin of convergent squint in H, we may be permitted to suggest that the cause of convergent squint in any other sort of refraction than H is not to be sought for in a paresis of accommodation (more suspected than proved by Donders) in emmetropes, nor in a too excessive endeavor of convergence by myopes,[1] but in the dynamic muscular relations.

The previous table also exhibits the well-known tendency of M to insufficiency of the interni. Yet it must addionally be emphasized that E and H frequently exhibit a latent D (E 42 per cent., H 37, M 59).

The pathological insufficiency of myopes has, on the one hand, been referred to too great exertion of the interni, and, on the other, to a restricted capacity of rotation dependent upon elongation of the eyeball (Donders). But v. Graefe[2] is inclined to refer this condition to a predisposition of the muscles, probably hereditary, while Mannhardt embraces a view entirely opposite to that of Donders, and regards the insufficiency as the principal cause of M. With the latter, it will be difficult to make our statistics harmonize. Can any one believe that *fifty-nine per cent. of our myopic school-girls acquired their refraction by insufficiency?* If we grant this, we cannot say the same of the remaining forty-one per cent. According to Mannhardt, we ought to believe additionally that all of the E and H children who showed insufficiency must finally become myopic. Yet the improbability of such an idea is demonstrated by the tables of Becker, in which a large number of adults have escaped the danger of becoming myopic despite well-marked insufficiency.

---

[1] *V. Graefe's Archiv*, Band x., p. 156.

[2] *K. m. f. A.*, 1869, p. 34.

Now if, on the other hand, we shall, like Donders, refer all cases of insufficiency in M to the causes previously suggested, we shall be obliged to look about for some other explanation for the same affection in E and H. Do we now require a great degree of mental compulsion to believe that the disturbance of the muscular equilibrium, which results so unfavorably to the interni, is frequently congenital with all sorts of refraction, and that the increase of this disturbance to an amount which produces excessive annoyance is caused by conditions which are peculiar to myopic eyes alone? Grant this, and we can then easily agree with Donders, and accuse the elongation of the eyeball, the consequent difficulty of motion, and the over-exertion of the muscles thus produced, as the cause of the increased insufficiency in M.

Leaving aside, however, all theoretical discussions, the examination of the dynamic relations of the lateral muscles may be of some practical value. It appears to be useful not only to pay attention to any existing insufficiency of the interni or externi of which the patients may complain, but to obviate them if possible. For this reason, whenever we order a pair of glasses for patients at our clinique we measure the muscular relations, and if we discover any deviation for the distance of which the glasses are chiefly or exclusively employed, the distance at which the lenses are to be set is properly modified. Thus, if a myope shows convergence for distant objects, we note for the optician, not the real pupil-distance, but a distance from two to eight *mm.* less. With convex glasses the pupil-distance is increased in the same manner. I do not know how extensively this method has yet been followed, but I heartily recommend its adoption everywhere.

Besides determining the relations of the two chief muscular groups, we must fix the MAXIMA OF ABDUCTION AND ADDUCTION.

It has been objected that no value can be placed upon the results of this method, because the capacity for abduction and adduction can be increased by exercise. But I would reply that after any such exercise the mutual relation of these maxima remains precisely the same.

Prof. Becker has been able to confirm by his experiments on stereoscopic vision with divergent visual lines[1] that, despite the capacity of voluntary divergence which he had personally cultivated in a high degree, the previous dynamic equilibrium of the externi and interni remained the same as before. Even to this date the professor's eyes are in a state of equilibrium for all distances, a fact that can only be explained by assuming that the capacity for isolated contraction of the interni increases simultaneously with the forced and isolated innervation of the externi. In point of fact, the relative relation between abduction and adduction, both for distant and near vision, has equally remained unaltered.

I append another table (IX.), which shows the various dynamic conditions with reference to their range of fusion. The persons referred to are the same 250 (50 E, 88 H, 118 M) already arranged in Table VIII.

The average values for the maxima of abduction and adduction, as given in this table, do not precisely correspond with those of Alfred Graefe,[2] who appears to give too large estimates for adduction and too small estimates for abduction. They do, however, appear to agree very nearly with those of Reich[3]:

	Far.			Near.		
	Abd.	Add.	Abd.: Add.	Abd.	Add.	Abd.: Add.
Reich	5.	15.	0.33	15.	24.	0.62
Table IX., 1 {Far Eq / Near Eq} Em.	6.2	13.2	0.47	11.5	20.2	0.57

Bjeloff also describes the relation between abduction and adduction as being about 0.50∓. Reich gives nearly the same figures.

In our cases with {F Eq / N Eq} this amounts:

	E.	H.	M.
for Far:	0.47	0.47	0.56
" Near:	0.57	0.57	0.71

and is consequently for F with E and H a little less than 0.50, for N a little more.

[1] Beitraege zur Lehre vom Sehen, etc.—*Sitzungsbericht der Wiener Akademie* (1861).

[2] Graefe-Saemisch, Band vi., Abth. 4, p. 41.

[3] *Nagel's Jahresbericht*, Band ii., p. 437.

TABLE IX.

RELATION OF THE MAXIMA OF ABDUCTION AND ADDUCTION TO THE RESULTS OF THE EQUILIBRATION EXPERIMENTS.

	Number.			Far.				Near.				Pupil Distance.	Number arranged according to age.				
			Per cent.	Eq.	Abd.	Add.	Abd. Add.	Eq.	Abd.	Add.	Abd. Add.		— 10	— 15	— 20	— 45	— 100
1. { Far Eq. / Near Eq. }	E	15	30		6.2	13.2	0.47		11.5	20.2	0.57	58.9 *mm.*		1	2	5	7
	H	27	36		6.4	14 4	0.47		12.1	20.8	0.59	59.4		2	8	9	8
	M	6	5		8.2	14.3	0.56		15.3	21.3	0.71	55.8		2	2	1	1
				Div.				D.									
2. { Far / Near } { Equal / D. }	E	3	6	2.3	5	8	0.62	2.3	10	20	0.5	55.6				1	2
	H	1	1	3	11	19	0.58	3.	20	25	0.8	59.		1			
	M	7	6	4.4	10.2	8	1.28	4.4	16.2	12	1.35	58.	1	1	1	4	
				Eq.				D.									
3. { Far Eq. / Near D. }	E	6	12		6.6	11.8	0.63	3.8	11.6	15.8	0.73	59.8		1		2	3
	H	11	12		7	11.0	0.58	4.2	15.5	18.1	0.85	59.4		1	1	5	4
	M	13	11		6.7	12.8	0.53	4.7	15.6	12.7	1.23	57.6	1	2	4	5	1
				Div.				Eq.									
4. { Far D. / Near Eq. }	E	6	12	1.5	8.6	11.3	0.76		13.8	19.8	0.69	60.2		1		2	3
	H	6	7	2.6	9.8	13.	0.76		16.3	17.6	0.92	58.8			3		3
	M	5	4	2.	7	12.2	0.57		17.2	16.6	1.03	58.2		2	2	1	
				Div.				Div.									
5. { Far D. / Near greater D. }	E	6	12	2.8	7.7	10.3	0.75	6.5	14.2	15	0.95	60.5				3	3
	H	7	8	3.3	6.8	8.4	0.81	6.	14.3	14.3	1.00	59.8			1	3	3
	M	39	33	3.8	10.6	11.3	0.93	11.6	21.	18	1.6	57.2	2	7	8	11	3
6. { Far D. / Near less D. }																	
				Conv.				Conv.									

7. { Far / Near } { Equal / Eq. }	E																
	H	6	7	2.5	7	18	0.38	2.5	9.2	21.2	0.43	56.4		1	2	3	
	M																
8. { Far Eq. / Near C. }	E	3	6	Eq.	7	12	0.58	C. 2.3	9.3	18.6	0.5	59			1		2
	H	2	2		7.5	10	0.75	3.	10.5	22	0.47	60			1		1
	M	2	2		9	12	0.75	2.	16	12	1.33					1	1
9. { Far C. / Near Eq. }	E	7	14	C. 1.4	8	17.3	05	Eq.	16.6	22	0.8	59				6	1
	H	18	20	2.	6.3	14	.045		10.8	20	0.5	57		5	3	10	
	M	18	15	2.7	7.2	13.7	05		15	15	1.0	58	1	2	5	9	1
10. { Far C. / Near greater C. }	E	1	2	C. 2.	6	11	0.54	C. 6	12	1.6	0.75	60					1
	H	5	6	2.3	6	16.4	0.37	3.8	14.6	21.4	0.68	56		1	1	2	1
	M	2	2	1.5	7.5	16.5	0.45	3.	10	27	0.37	57				1	1
11. { Far C. / Near less C. }	E	1	2	C. 3				C. 2									1
	H																
	M	3	2	7.7	4.3	22.7	0.18	1.7	11	21	0.5				1	1	1
12. { Far D. / Near C. }	E	1	2	D. 2.	16	10	1.6	C. 6	16	30	0.53	63					1
	H	2	2	3.5	9	11	0.82	4	20 5	18	1 14	59			1	1	
	M	1	1	1.	13	15	0.86	1	15	15	1	57				1	
13. { Far C. / Near D. }	E	1	2	C. 2	6	10	0.6	D. 5	18	18	1	56		1			
	H	3	3	2.3	5	14	0.35	2	13	20.7	0.63	59				2	1
	M	18	15	2.7	6.7	14.6	0.46	4.1	15.6	15 3	1.	59.2		4	1	11	

The influence of the dynamic preponderance of one group of muscles over another shows itself during the determination of the maxima of abduction and adduction in this way: If the interni are insufficient the maximum of abduction increases, and *vice versa*. In the first case the relation of the maxima is larger than 0.50, and may even pass beyond 1.00 up to 1.60 in M for N with $\left\{\begin{matrix} F & D \\ N & \text{greater } D \end{matrix}\right\}$; in other cases it is smaller, *e.g.*, 0.38 in H for F where the eyes for $\left\{\begin{matrix} F \\ N \end{matrix}\right\}$ show equal C. For N, this figure is larger in all the columns than for F.

Table IX. also exhibits the average length of the basal line, but it does not seem to be dependent upon any particular sort of refraction. Bjeloff asserts that the greater the pupil-distance, the greater the chance of discovering insufficiency of the interni, and of its higher amount. But our table does not show this. For (group 5) 39 M with $\left\{\begin{matrix} F & D \\ N & \text{greater } D \end{matrix}\right\}$ have an average pupil-distance of 57. 2 *mm.*, while (group 9) 18 M with $\left\{\begin{matrix} F & C \\ N & Eq \end{matrix}\right\}$ have a pupil-distance of 58 *mm.*, or, in other words, exactly the opposite from what one would suppose according to Bjeloff. It does not seem to me that there are any decisive results to be attached to the basal line. *The only point that we have so far discovered is, that hypermetropes generally show a less distance between the pupils than emmetropes and myopes of the same ages.*

ON RESECTION OF THE OPTIC NERVE.

BY PROF. C. SCHWEIGGER, IN BERLIN.

Translated by Dr. A. SCHAPRINGER, in New York.

DIVISION of the optic nerve, as a substitute for prophylactic enucleation of the eyeball, was first proposed by Von Graefe,[1] who based his proposal on the theory that sympathetic disease travelled along the commissura arcuata anterior of the chiasm. This theory, however, was speedily superseded by that formulated by H. Müller,[2] who thought that it was more probable that the sympathetic irritation was transmitted by way of the ciliary nerves. He was led to this conclusion by the fact that in many cases of irido-chorioiditis he found complete atrophy of the optic nerve, extending from the retina to the trunk, not a single fibre with double outlines being left, whilst the ciliary nerves had remained normal. The theory that these nerves were at the bottom of sympathetic trouble had already been advanced by Arlt[3] as long ago as 1853.

As a natural result of this theory endeavors were made to substitute the operation of cutting the ciliary nerves for that of enucleating the injured eyeball in order to prevent sympathetic ophthalmia. Rondeau proposed early ciliary neurotomy in 1866,[4] and said: "Nothing is easier than this operation, which I have repeatedly performed on the cadaver. A small opening is made in the upper inner aspect of the

[1] *Von Graefe's Arch.*, Bd. iii., p. 454 (1857).

[2] *Von Graefe's Arch.*, Bd. iv., 1, p. 368.

[3] "Krankheiten des Auges," Bd. ii., p. 50.

[4] Thèse de Paris: Des affections oculaires reflexes et de l'ophthalmie sympathique.—*Annales d'ocul.*, 1879, vol. lxxxii., p. 229.

conjunctiva; through this a narrow curved tenotome is introduced, with which the ciliary nerves, the optic nerve, and the ciliary arteries can be cut at one stroke."

Von Graefe suggested cutting a portion of the ciliary nerves within the sclerotic, and his suggestion was carried out by Meyer.[1]

It is worthy of remark that Von Graefe did not deem it feasible to preserve the eyeball if all the ciliary nerves were cut on the outside of it. In one case, in order to relieve the patient of annoying subjective phenomena of light and colors, he performed neurotomy of the optic nerve by introducing a suitable instrument along the outer walls of the orbital cavity to its apex, and severing the nerve near the foramen opticum.

In 1876 Boucheron[2] revived the idea of cutting the optic and ciliary nerves instead of removing the globe. He described the operation as follows: "An opening is made into Tenon's capsule between the external and superior recti muscles, at a distance of about one *cm.* from the cornea, by means of a pair of curved scissors; the eyeball is grasped behind the cornea by a pair of stout mouse-toothed forceps, and pulled forward in order to put the optic nerve on the stretch; this is then cut, as well as the ciliary nerves and arteries. In order to make sure that none of the ciliary nerves have escaped the scissors, the opening of the conjunctiva and Tenon's capsule is enlarged, and the globe is rotated so as to bring its posterior surface with the optic and ciliary nerves into view." Boucheron performed this operation on a patient, but owing to conditions which did not invalidate the principle of the operation, the case did not prove a success, and was published only in 1879 in a thesis by M. Redard.

Schoeler was the first to practice neurotomy of the optic and ciliary nerves methodically and in a considerable number of cases.[3] His method differed from that of Boucheron

---

[1] *Annales d'ocul.*, 1867, vol. lviii., p. 129.

[2] "Note sur la résection des nerfs ciliaires et du nerf optique de l'œil substituée à l'énucleation du globe oculaire dans le traitement de l'ophthalmie sympathique."—*Gaz. méd. de Paris*, 1876, and *Annales d'oculist.*, vol. lxxvi., p. 238.

[3] See the *Jahresbericht* of his Ophthalmic Institute, Berlin, 1878.

in so far as he divided the external rectus muscle, securing it by a thread of catgut in order to re-attach it to the eyeball at the close of the operation.

In a paper published a short time afterward I pronounced myself in favor of a similar procedure,[1] with this important difference, however, that I do not merely divide the optic nerve, but I excise a piece at least ten millimetres long.

I have become convinced, through a long series of experiments, that an exsection of such an extent is not feasible by operating on the temporal side of the globe, but, for obvious anatomical reasons, it is an easy matter, after entering the orbital cavity on the nasal side, to divide the optic nerve far behind the eyeball, then to rotate the latter, and cut off the stump of the nerve near its insertion into the sclerotic coat.

In consequence of the deeply rooted prejudice in favor of enucleation, optic neurectomy has as yet found few friends only. Objections have been raised to it which call for discussion. It is urged that in many cases where neurectomy had been performed, enucleation had to be resorted to subsequently. Now, I would ask: Under what circumstances must an eyeball be enucleated? In most of the cases brought forward, the operation was probably done from fear that neurectomy did not guarantee immunity from sympathetic ophthalmia. When is such fear justified? There can be no doubt that we are never able to foretell with certainty whether sympathetic inflammation will supervene or not. If we take into consideration the great number of atrophic eyeballs due to injury that we meet, where sympathetic trouble never took place, though all the conditions favorable to its excitation were present, we must come to the conclusion that sympathetic ophthalmia very rarely develops in cases where it appears to be threatening. In many instances in which I advised enucleation, my advice was not followed, yet no harm ensued.

It is commonly supposed that there is special danger in cases where the ciliary region is sensitive to the touch. This fear I do not share. Tenderness of the ciliary body is

[1] *Berliner klin. Wochenschr.*, 1878, No. 20.

present in almost every case of irido-chorioiditis or uveitis, and we meet with a great many shrunken eyeballs, with tenderness of the upper portion of the ciliary region of long standing, which have never induced any trouble in the fellow eye. It is remarkable that the tenderness is always confined to the upper part of the ciliary body.

Besides this, there is a group of symptoms called those of sympathetic irritation, as photophobia, asthenopia, lachrymation, and congestion of the conjunctiva, which are regarded as precursors of inflammatory processes, and therefore as indications for enucleation. These symptoms, if met with in individuals whose eyes are otherwise normal, are looked upon as trifling, and are usually treated by applications to the conjunctiva merely; but if the person who complains of these symptoms happens to be one-eyed, then it is quite a different thing—it is sympathetic irritation, and the eyeball "must" be enucleated. If one eye has been lost, the spectre of sympathetic irritation lurks in every corner. This fear is baseless in most of the cases, as can be exemplified by the very instances of sympathetic neurosis which have been best authenticated, and which, notwithstanding their long duration, never turned into inflammatory processes.

With an incredible want of discrimination, nearly every thing which can happen to an eye has been described as sympathetic trouble, if it occurred in patients who had one atrophic eyeball. We need not enter into any details, since a great deal of light has been thrown lately upon the pathology of our subject by the investigations of Knies and Deutschmann upon the transmission of inflammatory processes by way of the lymphatic vessels of the optic nerves. These are in accordance with clinical facts. It is probable that the path of disease is formed not only by the lymph-vessels of the optic-nerve trunk and the subvaginal space, but also by the supra-vaginal lymph-space, which communicates with the arachnoidal space on one hand, and with Tenon's space and the perichoroidal lymph-space on the other,—but this has to be proved yet by experiments. Whether the inflammation is caused by a chemical substance, or by micro-organisms, is immaterial.

The theory of the propagation of sympathetic inflammation by way of the ciliary nerves has never been supported bo proof, and has always been a mere hypothesis. In natural philosophy a hypothesis is justified as long as it is capable of explaining the causal connection of facts, and serves as an incentive for new investigations. If an hypothesis fails to explain new facts brought out in the progress of investigation, and proves sterile as regards such investigation, it is in a bad way; but when it ceases to do any thing else but engender new hypotheses, it is time that it should be demolished. Let us leave the ciliary-nerve doctrine to those dogmatists who believe that a statement is sufficiently substantiated by the fact that they believe it to be true. If we stick to the anatomical and experimental facts, we are obliged to draw the practical conclusion that enucleation ought to be replaced by neurectomy. It is not necessary to remove the exciting eyeball, if by exsection of a piece of the optic nerve we can remove the bridge by which the inflammatory process may travel from the injured to the non-injured eye.

I claim that a neurectomy properly performed is a better protective than enucleation. Not a few cases have been published in which the second eye, which was perfectly sound at the time the enucleation had been performed, nevertheless became a victim of sympathetic ophthalmia subsequently. I will cite only a few of the best authenticated observations: Mooren,[1] one day after enucleation; Schmidt-Rimpler,[2] four days after enucleation; Pagenstecher,[3] nine days after enucleation, and resulting in blindness; Steinheim,[4] on the second day after enucleation, also resulting in blindness. Knies[5] has published a case occurring in the practice of Horner, in which sympathetic inflammation made its appearance as late as three weeks after enucleation, resulting in complete loss of sight. In a case

[1] "Sympathische Gesichtsstoerungen," p. 85.

[2] *Klin. Monatsbl. f. Augenheilk.*, 1874, p. 179.

[3] Pagenstecher u. Genth: "Atlas der path. Anat. d. Auges." Explanatory notes to Taf. xxxviii., Fig. 12.

[4] *Archiv. f. Augenh.*, Bd. ix., p. 46, etc.

[5] "Ueber sympathische Augenerkrankung" (Festschrift), p. 66. Wiesbaden, 1881.

of Critchett's[1] it supervened fifteen days after enucleation, and resulted in nearly complete destruction of sight; in one published by Wood White[2] it appeared on the fifth day; in three cases published by Nettleship,[3] on the twenty-second, twenty-third, and twenty-fifth days; in the case of Bowers[4] on the seventeenth, and in that of Snell[5] on the thirty-second, day after enucleation. I cannot understand how under these circumstances enucleation can be lauded again and again as the "only sure" method.

The occurrence of sympathetic ophthalmia after enucleation has been performed is entirely incompatible with the ciliary-nerve theory. The supposition that the action of cicatricial contraction upon the stumps of the ciliary nerves caused the sympathetic trouble in these cases is untenable on its face, for cicatricial contraction takes place in every case of enucleation. Besides, in the few cases in which a cause of irritation of the ciliary nerves in the orbit after enucleation could be demonstrated, this did not cause sympathetic inflammation, but only nervous irritation of the fellow eye, as for instance in the case of Salomon,[6] in which the same symptoms of irritation which had furnished the indication for enucleation recurred when an artificial eye was worn.

If we consider that in no case of preventive enucleation it can be positively asserted, either before or after the operation, that sympathetic inflammation would have supervened if enucleation had not been performed, and if we therefore have to concede that it actually would have supervened only in a small minority of the cases, we must draw the conclusion that a few well-authenticated cases in which sympathetic inflammation occurred in spite of preventive enucleation have more influence in determining the facts than several peckfuls of eyeballs removed for safety sake.

[1] *Ophth. Hosp. Rep.*, vol. x., p. 322.

[2] *Brit. Med. Jour.*, 1881, p. 596.

[3] *Transactions of the Clin. Soc. of London*, vol. xiii., 1881.

[4] *Brit. Med. Jour.*, 1883, p. 1,000.

[5] *Transact. Ophth. Soc. of the United Kingdom*, vol. ii., p. 19. On p. 21 another case is brought forward by Frost.

[6] *Dublin Quarterly Jour.*, vol. xxxv., p. 58.

This is not an exaggerated expression, for Alfred Graefe[1] for instance, reports that in his practice "the ratio of enucleations (excluding those which were performed on account of tumors) to the number of patients was about ⅙ per cent. during the years 1860 and 1861, and about 1½ per cent. during the years 1880 and 1881," in the latter instance one enucleation occurring among every sixty-six patients. In my own practice the ratio of enucleations, including tumors, is only 0.5 pro mille, and that of neurectomies not more than two to three pro mille of the whole number of patients.

We can easily explain the occurrence of sympathetic inflammation after preventive enucleation, if this was performed late, so that the inflammatory process had had time to advance far in the lymphatic spaces. Under such circumstances the sympathetic inflammation will attack the other eye at the same time as it would have attacked it if no enucleation had been done. For this very reason it is necessary to divide the optic nerve as close to the foramen opticum as possible. Already four years ago I pointed out the necessity of removing at least ten millimetres of the optic nerve.[2] In performing enucleation the nerve is usually divided close to the eyeball. If the portion of the lymph-spaces remaining in the orbit be already diseased, the inflammatory process will go on the same as if enucleation had not been carried out. Of course, this can also happen after neurectomy, and I do not doubt that sympathetic inflammation may occur for several weeks after it. If we want to prevent extensive involvement of the lymph-spaces, we must operate early, and if we have to insist upon an early operation, neurectomy will certainly be found more acceptable than the disfiguring operation of enucleation.

Leber[3] has published a case in which so-called sympathetic inflammation occurred two years and a half after neurotomy had been performed, and S. C. Ayres[4] one in which it came on one year after enucleation. Both were

---

[1] Naturforscher-Versammlung zu Magdeburg, 1884.

[2] "Handbuch der Augenheilkunde," fourth ed., 1880, p. 369.

[3] *Von Graefe's Arch.*, vol. xxvii., 1, p. 340.

[4] These ARCHIVES, vol. x., p. 199.

instances of serous iritis, which has the same appearance whether it be of sympathetic origin or not. If one eyeball happens to be shrunken, it does not follow that serous iritis, developing in the other after a long interval has elapsed from the time of the original injury, is necessarily due to sympathy. As regards the case of Leber, one circumstance was wanting, to which Leber himself attaches great importance (see p. 333, *l. c.*), and justly. If the first eye has been atrophied for some time, we have no right to attribute to sympathy any inflammation of the uveal tract in the second eye, unless some renewed inflammation occur in the primary eye at the same time. In the case of Ayres something of this kind took place, as there was pain around the stump of the optic nerve; in that of Leber, however, the atrophic eyeball was hard and the region of the scar somewhat tender, but there was no trace of inflammation. According to my view the sympathetic nature of the uveitis has not been proven in either case, but if it be assumed for either one, it must also be conceded for the other, as well as for a third case published by Lawson,[1] who observed the development of well-marked and far-advanced sympathetic inflammation nine years after enucleation.

Properly speaking, I need not take Leber's case into consideration at all, since he performed only optico-ciliary neurotomy, merely dividing the optic nerve, whilst I claim that only the exsection of a piece at least ten millimetres long can be relied upon as a safe preventive measure.

Another objection that has been raised is that divided nerves are regenerated. It is not at all surprising that the ends of a nerve which has been simply cut through will reunite, but I will deny the possibility of regeneration if a piece ten *mm.* long has been exsected from the optic nerve until it shall be demonstrated as a fact. As regards the ciliary nerves I know very well that sensitive nerves are regenerated to an incredible degree, but then the theory that the ciliary nerves have any thing to do with the causation of sympathetic inflammation has been exploded. Besides, I have met with complete anæsthesia of the cornea after

[1] *Ophth. Hosp. Reports*, vol. x., p. 3.

complete denudation of the posterior circumference of the globe in very few cases, some peripheric portions usually retaining sensitiveness, and in none of the cases which I examined one or two years after the operation had the cornea fully regained sensitiveness, as could be easily demonstrated by comparison with the other eye.

It is interesting to note the behavior of the motor fibres of the ciliary nerves. If the operation be performed in a case with normal iris the effect is mydriasis ad maximum, so that atropia has no further influence. Eserine, however, will produce marked myosis, except in such cases in which the drug could not have produced any effect before the operation, as for instance in glaucomatous mydriasis. From this reaction to the influence of eserine no inference can be drawn as to the regeneration of the motor nerve fibres; besides, no contraction of the pupil can be produced by the entrance of light into the other eye.

The objection urged against neurectomy, that it causes atrophy of the globe, is baseless. It is well known that irido-chorioiditis can produce atrophy, and it ought not to be expected that neurectomy will prevent atrophy. I have not seen that atrophy occurred oftener after neurectomy than without it. On the other hand atrophy does not occur if the disease which necessitated neurectomy does not cause it. For instance, I have never seen atrophy follow if neurectomy was performed on account of violent pains in eyes with absolute glaucoma.

In two cases I noted changes in the other eye after neurectomy and I therefore publish them here.

CASE 1.—Anna B., æt. twenty. Her right eye was attacked by inflammation a year ago; the attack has recurred repeatedly. When admitted, July 21, 1881, a violent inflammation had been existing for three weeks. Her condition was as follows :

Right Eye.—Eyelids slightly red and swollen and kept closed most of the time. Entire circumference of pupilliary margin adherent to lens capsule, nodular protrusions of periphery of iris. Iris discolored, showing several dark specks. Ciliary region tender to touch. Violent pains in eyeball and entire right half of head as far as occiput. Tension slightly diminished, S=o.

Left Eye normal; M $\frac{1}{40}$, S $\frac{6}{6}$.

Neurectomy of right eye was performed July 21st. On July 22d moderate pain in right eye, headache completely gone.

August 2d. S of left eye diminished to $\frac{1}{3}$ or $\frac{1}{2}$, reads 0.4 at a distance of 20 *cm.* with difficulty. Field of vision complete. Outlines of optic disc blurred; its area, as well as that of surrounding portions of retina, opaque, grayish, and swollen. Vessels markedly curved, partially hidden by exudation. Small hemorrhage to the medial side of disc.

Ordered: Salicylate of soda as a diaphoretic. At the expiration of a week S was found to have markedly improved; the opacity and swelling of the retina disappeared slowly and were gone at the end of four weeks. She was discharged with M $\frac{1}{40}$, S $\frac{6}{6}$.

I saw her again in October, 1883, two years after the operation. The right eye had remained free from relapse; there was no atrophy, but the sensibility of the cornea was considerably less than that of the other eye. The fundus of the left eye was normal, S the same as last noted.

CASE 2.—Marie W., æt. twenty-seven, several years ago suffered from a painful inflammation of the right eye, which caused blindness, and was followed by several severe relapses. Of late she has been troubled with photophobia, lachrymation, and asthenopia of the left eye.

Condition on June 26, 1882. *Right Eye:* Pericorneal injection, cornea clear, anterior chamber shallow, periphery of iris bulging, pupillary margin completely adherent to lens capsule, yellowish-gray exudation in pupillary space, tension diminished. *Left Eye* normal, S=1.

June 27th. Exsection of right optic nerve.

July 5th. Outlines of left optic disc somewhat blurred, its area, as well as that of surrounding portions of retina, somewhat swollen, vessels tortuous, partially covered by exudation, S not diminished, being =1.

The ophthalmoscopic changes disappeared in the course of four weeks, the same as in the previous case, S remaining normal all the time.

Notwithstanding the large number of neurectomies performed I have not met with other similar cases. These phenomena might properly be ascribed to sympathy, since the causal relation appears to be well established, and

the probable path of propagation can be pointed out. There is no more bleeding in neurectomy than in enucleation, but in the latter operation the blood is drained off freely, whilst in the former it is kept back in the orbital cavity since the eyeball is replaced and the conjunctival wound sutured, and from there it is diffused into the surrounding tissues. The lids of the other eye are very often found to be bloodshot a few days after neurectomy has been done, an ecchymosis under the skin of the bridge of the nose indicating the way the blood had travelled. The subvaginal lymph-space of the stump of the optic nerve is to be regarded as a preformed path for the diffusion of the extravasated blood. A small quantity of the latter may thus be carried as far as the arachnoidal lymph-space, to be absorbed there after a short time without giving rise to any symptoms. But it is also possible for the extravasated blood to reach the subvaginal lymph-space of the other optic nerve by way of the chiasm and to occlude it temporarily by coagulation. The consequence would be lymph stasis in the optic nerve and the retina, the ophthalmoscopic picture of which in other intracranial processes we are so familiar with. Choked disc, as it occurs in cases of tumor of the brain, etc., is certainly produced in many instances in a similar way, viz., by lymph stasis in the optic nerve and the retina, caused by the increased intracranial pressure preventing the outflow of lymph from the subvaginal space.[1] In such cases the visual power is usually little interfered with, the same as in the two cases detailed above. It is not difficult to find an explanation for the fact that these ophthalmoscopic changes do not occur oftener, since the orbital hemorrhage need not enter the subvaginal space every time, as it cannot if the space be occluded by pressure from without. Besides, if the blood does penetrate there, the chances are more in favor of its reaching the subarachnoidal space, where it will be absorbed without causing any appreciable symptom than of its clogging the lymph-space of the other nerve. Nevertheless, the latter contingency is not impossible.

---

[1] See my "Handbuch der Augenheilkunde," fourth edition, p. 506.

The same holds good of sympathetic inflammations. An inflammatory process, starting from the damaged eye and proceeding by way of the lymphatic spaces, may there exhaust itself before reaching the arachnoidal space, and if it does reach it, it is at least as likely that it will run its course there without producing any symptoms, as that it will penetrate the lymph-spaces of the other eye. Thus it can be explained why sympathetic inflammation happily occurs so rarely in cases where the injured eyeball fulfils every condition which is known to be capable of starting it.

In operating, I proceed in the following way: After an opening has been made into the conjunctiva and Tenon's capsule, at a distance of about three millimetres behind the insertion of the internal rectus muscle, this muscle is laid bare, and two slightly curved, blunt, but knobless strabismus hooks are introduced beneath it. These hooks being drawn into opposite directions, one will be caught in the angle of insertion of the tendon and tend to roll the eyeball outward, whilst the other will draw the muscle forward out of the orbit. Near the latter hook a catgut thread is passed through muscle and conjunctiva, first from within outward, and then the opposite way. The muscle is now divided at a distance of at least five millimetres from its insertion into the sclerotic, and the ends of the catgut thread are united into a knot. A second thread is passed through the terminal stump of the muscle, and similarly bound into a knot. The wound is now extended both toward the superior and the inferior recti muscles, and a small pointed double hook inserted into the sclerotic as far back as possible, in order to draw the globe forward and outward. A pair of scissors curved on the flat are introduced alongside of the globe, and the optic nerve, which can be easily felt, since it is put on the stretch, is cut through as near the optic foramen as possible. The posterior aspect of the globe can now be exposed to view by means of the double hook, the optic-nerve stump remaining on the eyeball is cut off near its insertion into the sclerotic, the insertions of the oblique muscles are divided, and the whole posterior circumference of the sclerotic bared by dissection. Afterward, the eyeball is

replaced, the wound closed by means of the catgut threads previously introduced, and the lids stitched together by three silk sutures. The last is done as a precaution against the development of sanguineous exophthalmos, which disagreeable complication had best be avoided. There is no more danger of its forming after the lapse of four days, when the stitches can be removed. They usually have cut through by this time, either in the upper or the lower lid.

The operation looks very formidable, the eyeball being almost completely enucleated and remaining in connection with the recti muscles and the conjunctiva only. Nevertheless, the consequences of the operation are very slight, and scarcely a vestige can be found after healing.

In some exceptional cases I have had occasion to operate on such eyes where an ophthalmoscopic examination was still practicable. The retinal vessels then appeared to be completely bloodless except on the disc, as far as its margin, where they contained a small quantity of blood, furnished probably by anastomoses with the choroidal vessels. The ophthalmoscopic appearances of the choroid, on the other hand, were not changed at all. I need scarcely add that opthalmoscopic examination becomes possible only after the lapse of a sufficient space of time during which collateral circulation in the ciliary vessels could be established.

The indications for prophylactic neurectomy of the optic nerve are of course the same as those for enucleation. The operation ought to be performed as early as possible, and only upon sightless eyes. Neurectomy while as efficient a prophylactic measure as enucleation, has the great advantage that it neither sacrifices the eyeball nor renders an artificial eye necessary. Patients will therefore more readily submit to it than to enucleation. Persons with enucleated eyeballs always insist upon wearing artificial eyes, because an empty orbit is a disgusting sight, and only those suffering from enucleating mania will question the good taste of a patient who prefers even an atrophied eye ball to an empty orbital cavity. Apart from the general inconvenience connected with artificial eyes there are many cases in which they cause traumatic conjunctivitis, and are not tolerated at

all. Besides, most of the injuries which threaten to be followed by sympathetic ophthalmia occur among the laboring classes, among whom the expenditure for an artificial eye, which has to be renewed at certain intervals, becomes an onerous tax.

The choice between enucleation and neurectomy may be difficult in case of a foreign body being lodged in the eye, but even then the preventive action of neurectomy will be equal to that of enucleation, and the latter operation will not be absolutely necessary. It is well known that foreign bodies can become encapsuled in the fundus, and sight may remain good, though as a rule they cause blindness by irido-chorioiditis. After the latter has run its course, the eyeball often remains quiescent, as can be seen in many cases presenting themselves at the dispensaries. But foreign bodies may also produce repeated attacks of inflammation. If a fresh case presents itself, it is impossible of course to foretell which course it is destined to take, and I therefore deem it best to explain the matter to the patient, and to make him choose between enucleation and neurectomy. I have seen eyes remain quiescent for years after I had performed neurectomy. If, nevertheless, subsequent enucleation should become necessary on account of painful attacks of inflammation, it can be performed without any difficulty.

Neurectomy is especially indicated in cases of injury by perforating grains of shot, where enucleation should be kept in reserve, because it happens often that the shot traverses the globe completely, and becomes lodged in the orbital tissue. Under such circumstances the appearance of a perforating wound of the sclerotic may lead us into the error of diagnosticating the presence of a foreign body within the globe, when the latter, in fact, is outside of it. Sometimes it will be possible to recognize the fact that a grain of shot has traversed the eyeball and has become lodged in the tissue of the orbit, as for instance in case 3.

Case 3.—Mr. W., while hunting on Nov. 18, 1878, met with an injury to his left eye, caused probably by a grain of shot ricocheting from a rock. An operation was performed soon

afterwards (excision of prolapsed iris ?), and ice and atropia applied.

I first saw the patient on November 24th, and found the point of entrance in the lower portion of the corneal limbus. The conjunctiva of the globe was very red, and its lower half so much swollen that it protruded between the lids. The anterior chamber contained some blood. Cornea and lens clear, pupil moderately dilated, no iritis, fundus not visible. Slight quantitative perception of light, since only a bright lamp could be made out. Pains which had been strong, have moderated. The presence of exophthalmos led me to the supposition that the shot was not lodged within the globe, but outside of it in the orbital space. I did not see the patient again until February 23, 1879. The cornea then was clear, and there was an anterior synechia in the cicatrix. Lens clear, dense opacities in vitreous, conjunctiva injected, ciliary body tender.

Neurectomy performed on February 27th. When the globe was rolled outward, some fatty tissue was found adherent to its posterior aspect, which contained the shot. A black dot below, and to the outer side of the optic-nerve entrance, marked the point of exit.

The wound healed without any trouble, and the other eye had remained normal until the present time, being six years after the operation.

In regard to the effect of neurectomy upon sympathetic neurosis, I will relate the following case:

CASE 4.—Mrs. H., æt. forty-five, was admitted to our wards on May 30, 1882, on account of double cataract. *Right Eye*, $S = \frac{1}{18}$. *Left Eye:* Lens completely opaque, movements of hand at one metre. June 1st, peripheric extraction of left lens. After iridectomy the lens is found to be dislocated downwards, and has to be extracted by means of a platinum-wire loop. Healing normal. Discharged June 28th, with $H = \frac{1}{4}$, $S = \frac{6}{18}$, reads 0.4 with $+ 2\frac{1}{2}$.

In February, 1883, the patient returned to have her right eye operated upon, with which she now could only make out motions of the hand at a distance of one metre. February 8th, extraction of right cataract, operation smooth. The eye did well during the following four days, but then irido-chorioiditis set in, with hypopyon, discoloration of the iris, and masses of exudation behind it.

The eyeball grew smaller, and she was discharged March 15th. Returned June 19th. Has had pain occasionally in her right eye, notably on pressure. Also complained of dazzling, and of a blue sheen before the left eye. Right eye slightly injected, somewhat smaller and softer than the left; cornea a standing oval, transparent. The scar from the operation sunken, and somewhat congested. Anterior chamber narrow, iris yellowish-green (the left iris being blue), pupillary space being obstructed by a yellowish mass. Perception of light, but no projection. Left eye normal, with $+\frac{1}{4}$, $S = \frac{6}{18}$, reads 0.4 at 20 *cm.*, with $+ 2\frac{1}{2}$. On June 20th neurectomy was performed upon the right eye. On June 24th the patient stated that the "blue sheen" before the left eye had disappeared. Discharged July 3d.

The immediate disappearance of photophobia and the subjective sensation of light after the operation of neurectomy, proves that these phenomena were of sympathetic origin— and would enucleation have accomplished more? Whether the reflex irritation had travelled by way of the ciliary nerves or the optic-nerve fibres I will not attempt to decide. The latter was certainly possible, since the patient had quantitative perception of light in the eye operated upon, proving that the optic nerve still contained fibres of unimpaired conductibility.

But under all circumstances the transmission of an inflammation from one eye to the other is accomplished in quite a different way from that of a reflex neurosis, and Mooren[1] is mistaken in contradicting the universally recognized fact, that sympathetic *inflammation* never occurs before the lapse of from three to four weeks after injury of the other eye, substantiating his view by the fact that reflex *neurosis* has been observed at a much earlier period.

The sympathetic character of a neurosis can be established only by its disappearance after enucleation or neurectomy. If the neurosis subsides only gradually in the course of a few weeks after the operation, the question whether *post hoc* or *propter hoc* would be difficult to decide. Observations of a considerable series of similar cases are evidently necessary to enable us to form intelligent conclusions. But if enucleation

[1] "Fünf Lustren," Wiesbaden, 1882, p. 147.

has no effect upon the neurosis, then I consider it proved that the trouble was not of sympathetic origin. If this is not conceded, then every thing that may happen to one eye after injury to the other will have to be ascribed to sympathy, which is a simple thing to do, but which, under certain circumstances, may involve serious consequences. In order to elucidate this, and also to show a specimen of the reckless speculation prevalent in the literature of this subject, I will quote the following passage:[1]

"Subjective sensations of light have been rarely met with. These phenomena should not be ascribed to sympathy, but to central irritation. Prof. Alfred Graefe on one occasion informed me that he was compelled to enucleate an eyeball one year after an injury and *while sight was almost perfect*. The other eye was completely normal. At last accounts, which was six months after enucleation, the photopsiæ continued unabated, and caused so much suffering that fears were entertained about the patient's life. At the microscopic examination made by Th. Leber a fragment of a gun-cap was found firmly adherent to the ciliary body. The latter was otherwise normal, only the adjacent portion of the pars ciliaris retinæ being thickened. A small adjoining portion of the vitreous was infiltrated with pus. Nothing more was found except hyperplasia of the intraocular end of the optic nerve."

Mauthner,[2] who quotes this case, thinks that the photopsiæ "were undoubtedly started and entertained by the products of inflammation deposited in the chain of the optic nerves. The hypertrophy of connective tissue in the intraocular end of the optic nerve found by the microscopist serves as an important guide. It was this hypertrophy of the interstitial connective tissue within the optic-nerve chain which compressed and mechanically irritated the nerve fibres."

Mauthner is evidently going too far. He exaggerates the hyperplasia of the connective tissue found in the intraocular end of the optic nerve into hypertrophy of the connective tissue of the optic-nerve chain, irritating the nerve fibres by

[1] Peppmüller: Ueber sympathische Augenaffectionen, *Arch. f. Heilkunde* 1871, p. 226.

[2] "Vorträge," Wiesbaden, J. F. Bergmann, 1881, Bd. i., p. 73.

compression, and calls this the cause of the subjective sensations of light. Before the invention of the ophthalmoscope an erroneous idea was generally upheld, that inflammation of the retina or the optic nerve ought to produce the most formidable subjective sensations of light. Since then optic neuritis and hyperplasia of the connective tissue of the optic nerve are met with every day, but they never produce photopsiæ.

Did Mauthner have this case in mind when he made the remarkable statement that a sympathetic neurosis could eventually prove more dangerous than serous iritis?

I can only adopt the opinion of Peppmüller, that the photopsia which set in one year after the injury was not of a sympathetic nature, but of central origin, and for this reason the eye ought not to have been enucleated. Even if indisputable sympathetic inflammation had been present, the enucleation of an eye possessed of almost complete visual power was not justified, according to generally recognized rules. Neither would neurectomy have been so. This eye was evidently one of those which can contain a foreign substance for a long time without any marked disturbance of vision and any other bad consequences. But such eyes do not afford any safety from any neurosis of central origin, just as little as eyes which have not been injured at all. Subjective sensations of light, like neuralgia, may be of peripheric or central origin. Instances are numerous indeed in which neuralgia of branches of the trifacial persists after cutting these branches. Why should the optic nerve never behave in a similar way? It does not always behave so, and for this we ought to be thankful. I remember a patient of Albrecht von Graefe who complained of tantalizing flashes of lightning in his blind eye. After enucleation the flashes continued in the empty orbit.

The severe subjective sensations of the last two cases were possibly of hemiopic nature, the same as the so-called flittering scotoma (*Flimmerscotom*), and were referred by the patients to the eye of the corresponding side.

If subjective sensations of light in blind eyes are of intraocular origin, the disfiguring operation of enucleation is

unjustifiable, since relief can be given by neurectomy without removing the eyeball, as shown in the following instance.

CASE 5.—Hermann St., æt. twenty-nine, highly myopic, became blind in his left eye in the month of September, 1882, by detachment of the retina, which showed a rupture above and outward. When examined in April, 1883, this eye was completely blind; the pupil did not respond to the stimulus of light. Careful examination revealed slight quantitative perception of light in the direction of the visual axis. He complained of a continuous flickering before this eye, which increased when he was reading or writing, on which occasions he also noticed a slight flittering before the other eye. The latter had $M = \frac{1}{6\frac{1}{2}}$, $S = \frac{1}{4}$. I advised neurectomy of the left optic nerve for the relief of the symptoms on the same side, but did not give any promise in regard to the right eye. Before accepting my proposal, the patient sought advice elsewhere and was told that the eye had to be removed. In the month of June irido-chorioiditis set in in the left eye. The pupil was kept widely dilated by atropine, but a small synechia at the lower portion of the pupil remained. Neurectomy was now performed, while the inflammatory process was still progressing, with the result that the photopsiæ of this side ceased completely and permanently. In the other eye there was occasionally some flittering on exertion, but this also disappeared in the course of about nine months.

The unusually wide dilatation of the pupil in the eye operated upon was striking, the iris appearing as a very narrow rim, except below at the place of the synechia. Subsequently cataract and atrophy of moderate degree developed, as is usually the case in irido-chorioiditis in consequence of detachment of the retina.

In sympathetic inflammation neurectomy accomplishes the same results as enucleation, but here I wish to emphasize that no other chapter of eye-surgery has been as fruitful of illusions as this.

A. von Graefe[1] maintained, "with the greatest certainty," that he had observed a beneficial effect upon the other eye from an iridectomy performed upon the exciting eye. Who believes this nowadays?

The cases which are brought forward to prove the salutary

[1] *Von Graefe's Arch.*, Bd. ii., 2, p. 249.

effect of enucleation are all cases of serous uveitis, which always has a more favorable prognosis, and if the histories be examined more closely, the sympathetic nature of the disease will mostly remain in doubt. On the other hand, there are, of course, no objections against exsection of the optic nerve in a blind eye, if sympathetic inflammation has already begun in the other.

Violent pains in a blind eye, as, for instance, in absolute glaucoma and in chronic irido-chorioiditis, will also furnish an indication for neurectomy. In glaucoma immediate and complete cessation of the pain can be counted upon ; in irido-chorioiditis relapses may occur, but they are the exception.

Finally, I will add that I have performed neurectomy with satisfactory results in cases of repeated and painful formation of blisters on the cornea of blind eyes, for which enucleation is frequently resorted to. The formation of blisters was not stopped, but the process of their formation became painless, and that is all we can ask for.

ON THE MEASUREMENT OF THE DEGREE OF ANÆSTHESIA PRODUCED BY COCAINE.

By Dr. LUCIEN HOWE, of Buffalo, N. Y.

(*With diagram.*)

IT is a well-established physiological fact that the irritation of a sensitive nerve produces an increase of blood pressure. This can be exactly measured with a suitable apparatus.[1] The following observations are based upon a knowledge of this circumstance. For, if one eye be brought under the influence of cocaine, the other remaining normal, it would seem possible to have the blood pressure indicate the degree of comparative sensibility. The effects are so prompt and so constant as to render this branch of study one of the most interesting in the whole range of physiology, and the results, if applicable to the human subject, teach us more than the varying description of different patients. The experiments here mentioned were conducted at the suggestion, and with the frequent aid, of Professor Zuntz, in his laboratory in Berlin, and though indebted to him for most valuable assistance, still there remained in this, as in the investigation of every new field, much to be learned from one's own failures. Success in these attempts depends so largely upon attention to detail, that it appears worth while to be explicit concerning the technique of the procedure. A description of the method pursued naturally resolves itself into a consideration of:

[1] Aubert in Hermann's "Handbuch Physiologie," vol. iv., part 1, p. 391. Von Bezold: "Untersuch. ueber der Innervation d. Herzens," p. 191. Loven (und Ludwig): "Bericht der Sæchs. Ges. der Wiss.," 1866 S., 85. Foster: Second American Ed., pp. 260–270.

1st.—The preparation of the animal.

2d.—The apparatus for registering the blood pressure.

3d.—The arrangement for artificial respiration.

The animal best adopted for the purpose is a rabbit, and, the less adipose tissue it has, the less will be the difficulties of dissection. In some laboratories ether is used in such experiments, but, if the incisions are properly made, they are hardly more than skin-deep, and not more painful than those frequently inflicted upon the human subject without resort to an anæsthetic. In any case, the rabbit is first securely fastened, and the head either held by an assistant, or, still better, fixed in a Czermak's support,[1] for the purpose of keeping it quiet, while one tube is inserted in an artery and another in the trachea. It is usually more convenient to make the latter operation first. The hair having been cut away, a vertical incision is made in the median line, just below the prominence of the thyroid cartilage. By drawing aside the muscles the trachea is exposed, a grooved director passed under it, and through this a stout thread, ready to be tied. A glass canula is now selected, in the form of a T or Y, the size of the long arm of which should correspond very nearly with that which the exposed trachea is found to have. Moreover, it is held in place better if the end of the tube is a little enlarged. Before opening the trachea it is advisable to have ready one or two strips of blotting-paper, with which to remove the few drops of blood which may appear when that is divided. This is done by separating two of the rings with a sharp knife, so that they are attached by only a short piece of the cartilage posteriorly. The lower end of the trachea is thus kept from retracting into the thorax. Any oozing having been wiped away, the canula is introduced, the string tied, and if desirable the skin drawn together over the tube and united by a stitch. The introduction of a tube into an artery is a more delicate operation.

The two vessels which may be chosen are the carotid and the crural. For the present purpose the latter is usually

---

[1] See "Hand-book for the Physiological Laboratory," J. Burdon-Sanderson, fig. 204.

the better. The only suitable place to reach it is where it crosses Poupart's ligament, or where the pulsations can first be felt as the vessel descends. If the incision is made directly over it there is found beneath the skin a quantity of fat, varying with the condition of the animal. This being lifted up and inward, the pulsating vessel is seen at once, with the vein lying on the inner, and the crural nerve on the outer side. It facilitates the operation if the nerve is immediately divided, since the necessary manipulation causes pain to the animal, and consequent muscular contraction with variations of the blood pressure. Of course the artery must be isolated, but it is quite as important that every one of the branches be tied, even if they have contracted to almost microscopic size—as they often do. It is sufficient to ligate them once. Having isolated thus five or six millimetres of the artery, a ligature is tied around it below, another thread passed around it ready to be tied, and it is closed above with a very small clamp. The vessel is then simply nicked near the ligature, with sharp scissors, and the drop or two of blood which it contains is allowed to escape. So small an opening in so minute an artery is sometimes difficult even to see, but the aperture can be enlarged with a blunt needle till the introduction of a comparatively large glass tube is possible. This canula, which is small only at the point, and which has attached to it a few centimetres of rubber tubing, can then be tied in place. Not a drop of blood should enter it, and if the operation has been properly executed, not more than one or two have been lost. As soon as the two canulas have been introduced into artery and trachea respectively, the animal should be so protected as to retain its normal temperature. Experience proves that when any animal is extended in this constrained position, the body soon cools sufficiently to interfere with an experiment. A wrapping of cotton is sometimes enough to obviate this, but it is more convenient to use artificial heat, applied by a warmer. This consists of a sheet of galvanized iron a couple of feet long, and almost as wide, bent into a half-cylinder. A similar half-cylinder, more curved, is fitted within this, leaving a space between, which will hold

warm water. A second double half-cylinder can be made to rest upon the first—the two forming a tube,—and in this way the temperature of the animal can be maintained at the proper point.

Having described thus the manner of preparing the animal, it is proper to give some idea of the apparatus for registering the blood pressure.

The mercurial kymograph,[1] or instrument for measuring blood pressure, consists of two portions: a manometer, and a recording drum-wheel. The first is a U-shaped glass tube, about thirty centimetres long, half filled with mercury. One end of this is connected with the artery by means of a tube composed of alternate pieces of glass and rubber, the object of the combination being flexibility, the least possible expansibility, and a sufficient degree of transparency to allow air bubbles to be seen. This connecting tube is intended to contain some solution having about the same specific gravity as blood. Reference will be made to it later. The end of the manometer, opposite the one joined to the artery, has, floating upon the mercury, a delicate upright rod, and, attached horizontally to its upper end, is the so-called "pen." This is a piece of glass drawn to a fine point, which rests upon the surface of the drum-wheel. The latter is revolved by clock-work about a perpendicular axis, and of course receives the tracings of the pen-point. For convenience the outside of the drum is covered with a piece of lamp-blackened paper, on which the course of the pen is easily seen. By means of this arrangement every variation of the blood pressure is communicated from the artery through the intervening tube, and through the mercury, causing the pen to rise and fall with each pulsation of the heart, and at the same time to record the larger excursions due to greater alterations of the pressure in the entire arterial system. It is quite essential to the success of these experiments that the animal be under the influence of curare, and therefore artificial respiration becomes neces-

[1] A description of one very similar to that used will be found in Rollett's article of "Hermann's Handbuch der Physiologie," vol. iv., p. 231. See also Burdon-Sanderson's "Hand-book for the Physiological Laboratory," fig. 202, or "Methodik zur physiologischen Experiment. und Vivisection," von E. Cyon, plate xviii., fig. 1.

sary. Without this narcotic the animal instinctively closes the lids when an instrument or any object approaches the eye. Any attempt to open them is accompanied by an increase of the blood pressure, rendering it impossible to distinguish this effect from that of an irritant applied directly to the globe. It is therefore advisable to administer about 1 *cc.* of a one-per-cent. solution, hypodermically, some ten minutes before commencing, and repeat this dose at the end of that time if the effect is not then quite sufficient. Should the operation continue a long while, the same amount must be given again at the end of an hour. The general plan of the apparatus for artificial respiration is as follows: By means of a Sprengel water-pump, a current of air is sent into the lungs, and also drawn off after being respired. The pressure is regulated by the air passing, each way, through a bottle containing more or less water, as required. Finally, the current is interrupted at stated intervals, corresponding to the normal rate of respiration, by means of an electro-magnet, having a pendulum movement. The greater part of the apparatus was described by Dr. Curt Lehmann, in the *Verhandlungen der physiologischen Gesellschaft zu Berlin*, July, 1883, p. 48, and to him I am personally indebted for many hints as to its management and for suggestions leading to its further improvement. Having referred thus to the method of preparing the animal, of recording the blood pressure and continuing respiration meanwhile, it is proper next to state the manner of connecting the artery with the kymograph, and the plan of the experiment. Supposing the artery has already been dissected out in the way described and a canula introduced, the latter is filled, from a capillary point, with a portion of a solution contained in the tube connecting the artery to the mercurial column. Various mixtures are recommended for this, and very satisfactory results have been obtained from the use of the extract of leech heads in a 0.6 per-cent solution of salt water.[1]

[1] It is well known that the blood from a leech bite does not coagulate readily, and, as coagulation in the canula is a great obstacle to the success of such experiments, Dr. Haycraft advises that the heads of four leeches be cut in pieces, macerated for twenty-four hours in a solution of salt water (0.6 per-cent.), then filtered, and enough more of the salt water added to make 50 *cc.* The experiment was quite successful.

In filling the tube, considerable care must be exercised to avoid the introduction of air bubbles. It is therefore advisable to have one off-set, or branch, near the instrument, and another near the end, to be attached to the artery—or rather to the canula fastened there. A syringe filled with the solution is applied to the opening near the kymograph, and, while the rest of the tube is held upright by an assistant, a sufficient quantity is injected to fill it entirely. Several air bubbles, however, will remain between the solution and the mercury. The upper part of the tube must then be closed, and by suction these bubbles can be drawn into the syringe. By injecting the solution a second time, the tube is properly filled. Both the short branches are then clamped, and the end slipped into the piece of rubber tubing already on the canula. The connection is then ready to be completed, as soon as the clamp is removed from the artery. An estimate, however, must first be made of the pressure exercised upon the mercury merely by the column of water in the tube when in its proper position. For this purpose the pen is made to rest against the paper, and the drum revolved once. This is the zero line. Every millimetre that the pen is elevated above this, is due to the blood pressure only. If the clamp on the artery were now removed, the blood would tend to flow out of the animal into the tube, mingling with the fluid there; but the weakening effect of this can be avoided if pressure be made in the tube before the artery is opened. Accordingly, a sufficient quantity is injected from the syringe to force the pen up almost to the point it will subsequently reach—for a rabbit about fifty millimetres. When this is done, the clamp near the nozzle of the syringe is reapplied, and all is ready. The moment the clamp on the artery is removed, the arterial pressure forces up the pen, which at the same time makes short and rapid vibrations, corresponding with the contractions of the heart. As a certain amount of blood flows into the tube, so does the fluid in it to an equal extent, enter the circulation, producing an irritation which causes the pen to register at first a pressure considerably higher than normal. A few moments, therefore,

must be allowed for this effect to disappear before the drum is revolved, or any tests made. In most of the observations the drum of the kymograph was not revolved constantly, but merely a perpendicular line recorded as the pen was forced up. On the effect subsiding, another place was chosen, and the pressure again noticed when the other eye was irritated in the same manner. Very frequently, however, the length of time which the irritation lasted was measured by revolving the drum at a given rate. When this was done, an electric clock marked upon the drum, with a second pen—like the first,—each interval of five seconds.

In this way the blood pressure was written in a curve, the form of which showed, of course, whether the effect of the irritation was slow or prompt. The irritants used varied greatly. The conjunctiva and cornea of each were scratched with a piece of paper rolled to a point, and with the head or point of a pin. These two parts, as also the iris, were incised, and portions removed, and finally the effect of a current of electricity was tested upon each, by means of the induction apparatus of Du Bois-Reymond.

It is by no means an easy thing for the experimenter to estimate the amount of violence done in a given case, when touching the eye with any instrument. Thus in rubbing the conjunctiva or cornea with a piece of paper, the reaction upon the same eye varied considerably when there was an apparently insignificant change in the method. Accordingly, when the comparative tests were made, the irritation was applied, as nearly as possible, in the same way to each eye. In the case of operations of puncturing the anterior chamber, iridectomy, etc., perfect similarity of procedure could not be obtained. With Du Bois-Reymond's induction apparatus, however, the results were more satisfactory. The electrode was first placed on the part, and the increased blood pressure caused by this act allowed to subside. The key was then opened and the effect of a given current, for a given time, noted.

These apparently unimportant details have been dwelt upon at some length, not alone that so much depends upon

them, but particularly because I am unaware of any text-book, or article, giving the entire procedure in the manner which my experience, at least, teaches me is most advisable. In the following tables the varying heights of the blood pressure is given in millimetres. Proper allowance is also made for the force which depresses the mercury in one arm of the manometer and at the same time elevates it in the other—that is, the perpendicular excursions of the tracing point, above the line of no pressure, are in each case doubled. It has

The above diagram gives some idea as to the plan of the experiment. A is the line drawn by the electric attachment to a clock, the space between each one of the depressions being ten seconds in this instance. B is the zero line of no blood pressure. C is the line showing the variations of pressure. The small waves represent the heart's action. At 17 a current from a Du Bois-Reymond's apparatus was applied to the eye without cocaine. A small point above the line indicates when this was first applied, and a second point shows when it was removed. It will be noticed that the pressure then rises a considerable degree. At 18 a current from the same apparatus, of the same strength, was applied to the eye under the influence of cocaine. In this case the rise was very much less than at 17. At 19 the irritant was again applied to the eye with cocaine, with the same result virtually as at 18. The small perpendicular lines above the curve indicate, as before, the application and removal of the irritant. Between 17 and 18 it will be noticed that the pen marking the time was accidentally arrested in its regular action, and also that a sudden rise and fall of blood pressure occurred, due to extraneous causes. Allowance must be made for such sources of error, but the curve is given just as drawn.

been unnecessary, however, to take into account the force expended in dilating the connecting tube, for the reason that it was reduced to the minimum, and more especially that we here deal, not with absolute, but with comparative, variations. In attempting to give the results of the ex-

periments bearing on this part of the subject, it seems best to class together those on the different animals relating to the conjunctiva, cornea, or iris, since, the comparative effect of various irritants being tried on each of these structures in turn, it would tend to confusion if the method of procedure with each rabbit were detailed, and the conclusions drawn from the whole. In the following tables, the first column indicates the number of the observations according to this arrangement, marked simply for convenience in future reference. In the second column, the animal on which the operation was made, is identified, while the two eyes of the animal are indicated in the text by *N*, the normal one, and by *C*, the one under the influence of cocaine.

The nature of the irritant is described in a separate column. When electric current is mentioned, reference is made to the magnetic interrupter of the Du Bois-Reymond's apparatus.[1]

For that the distance between the two coils is given in millimetres and the greater this is the less the strength of the current. The length of time which the irritant lasts is an important factor, however, and is therefore usually stated. The blood pressure is given in millimetres, the point of beginning and sûbsequent rise being in separate columns, while the following one gives the difference between the tests in the two eyes. Thus, in the example first cited, the rise of pressure in the normal eye from thirty to thirty-three is only one millimetre greater than from thirty-one to thirty-three in the eye with cocaine. The strength of the solution, and the amount dropped into the eye, varied with different animals, and at different times with the same animal. These are facts of such evident importance that it would be of advantage to represent them also in the same table, but as the object of the present arrangement is more to show the effects of cocaine upon different parts of the eye, it was practically impossible to include in those records the various doses as noted, and the length of time between them, without giving rise to con-

[1] **Burdon-Sanderson, p. 351, fig. 293.**

fusion. Accordingly, when mention is made to the quantity or time, in the conclusions which follow, these refer more especially to another arrangement of the same data, with regard to these two factors. In the future it is hoped to show their relations more clearly. In general it was intended to keep up constantly the effect of as large a dose as had been previously found would produce the maximum effect in other rabbits. A variation from this rule was one of the reasons why the results, in the different tests, were not always the same. When the pupil remained undilated, or the dose was otherwise known to be insufficient, the fact was usually mentioned in the record.

Out of 124 observations there are 104, or 52 pairs of tests, which can be properly compared with each other. These do not include similar experiments made upon a few guinea-pigs and cats, when it was necessary to verify the method of procedure.

The results obtained can be formulated best as follows:

1st. When the same irritant is applied, under the same circumstances, to each eye, the rise in blood pressure is less in the eye under the influence of cocaine than in the other. The degree of difference in the two varies in proportion to three factors. These are:

(*a*) THE AMOUNT OF COCAINE USED.

While a .02-per-cent. solution will produce a difference in the size of the pupil, it required a .04-per-cent. solution to show any difference in the sensibility of the two eyes, as indicated by the blood pressure. A drop of this seemed to be the minimum amount which would produce any anæsthesia in the rabbit or cat. On the other hand, a two-per-cent. solution, at the time of its maximum effect, produces as much anæsthesia as one of four or five per cent. If the same rule applies to the human subject, it would seem useless to make the solution as strong as that frequently employed.

(*b*) THE TIME REQUIRED FOR ITS ACTION.

The minimum dose will produce a difference in the blood pressure, on the average, in from seven to sixteen minutes.

CONJUNCTIVA.

Obs.	Animal No.	Eye.	Irritant.	Begins.	Rises.	Difference.	After.
1	3	n	Touched lightly with paper.	30	33	1	4 m.
		c	" " " "	31	33		
2	1	n	Rubbed lightly with paper.	72	74	1.5	
		c	" " " "	74	74.5		
3	5	c	Rubbed with paper.	84	90	10	
		n	" " "	82	98		
4	4	c	Rubbed with paper and with a pin.	56	56	36	14 m.
		n	Rubbed with paper and with a pin.	56	72		
5	5	c	Introduced speculum.	86	98	40	12 m.
		n	" "	88	140		
6	4	n	Scratched with a pin.	60	100	38	
		c	" " " "	62	64		
7	3	c	Caught with forceps.	28	30	4	
		n	" " "	38	44		
8	2	n	Palpebral conj. pulled three times.	70	78	5	
		c	Palpebral conj. pulled three times.	70	73		
9	2	n	Palpebral conj. pulled five times.	70	80	8	
		c	Palpebral conj. pulled five times.	72	74		
10	3	c	Caught with forceps.	98	106	0	40 m.
		n	" " "	96	104		
11	3	c	" " "	42	43	6	
		n	" " "	42	49		
12	3	c	" " "	84	86	14	
		n	" " "	84	100		
13	2	n	Caught with fixation forceps.	70	84	10	
		c	" " " "	70	74		
14	1	n	Fixation forceps applied.	68	120	50	18 m.
		c	" " "	72	74		
15	1	n	Fixation forceps applied in same place.	68	121	41	19 m.
		c	Fixation forceps applied in same place.	76	88		
16	1	n	Fixation forceps applied.	72	80	5	
		c	" " "	71	74		
17	1	n	Electric current, 10 sec., coil at 65 *mm.*	76	104	24	
		c	Electric current, 10 sec., coil at 65 *mm.*	80	84		
18	5	n	Electric current, 60 sec., coil at 90 *mm.*	84	128	40	8 m.
		c	Electric current, 60 sec., coil at 90 *mm.*	84	90		
19	4	c	Electric current, 20 sec., coil at 75 *mm.*	50	60	24	17 m.
		n	Electric current, 20 sec., coil at 75 *mm.*	49	83		
20	4	n	Electric current, 12 sec., coil at 75 *mm.*	62	80	10	
		c	Electric current, 12 sec., coil at 75 *mm.*	64	70		

CORNEA.

Obs.	Animal No.	Eye.	Irritant.	Begins.	Rises.	Difference.	After.
21	2	n	Touched lightly with paper.	52	58	0	
		c	" " " "	60	64		
22	2	n	" " " "	70	74	0	
		c	" " " "	70	74		
23	5	c	" " " "	84	86	4	
		n	" " " "	82	88		
24	5	c	Rubbed with paper.	84	96	10	
		n	" " "	88	110		
25	1	n	" " "	70	84	13.5	8 m.
		c	" " "	72	72.5		
26	1	n	Epithelium partly removed.	68	72	3	2 m.
		c	" " "	72	73		
27	4	c	" " "	65	71	10	
		n	" " "	68	84		
28	3	n	Removed piece of cornea about 3 x 2 *mm.*	56	90	32	14 m.
		c	Removed piece of cornea about 3 x 2 *mm.*	30	32		
29	4	c	Removed piece of cornea about 2 x 2 *mm.*	58	62	22	
		n	Removed piece of cornea about 2 x 2 *mm.*	64	90		
30	1	n	Removed piece of cornea about 3 x 2 *mm.*	60	110	18	
		c	Removed piece of cornea about 2 x 2 *mm.*	70	102		
31	5	c	Removed piece about 2 x 2 *mm.*	82	106	9	
		n	Removed piece about 2 x 2 *mm.*	83	116		
32	3	n	Punctured cornea with syringe-needle and drew out aqueous humor.	40	101	41	
		c	Same procedure with other eye, and in addition injected the anterior chamber full of a five-per-cent. solution of cocaine.	68	80		
33	5	c	Electric current, 5 sec., coil at 80 *mm.*	110	118	4	5 m.
		n	Electric current, 5 sec., coil at 80 *mm.*	110	122		
34	5	c	Electric current, 20 sec., coil at 70 *mm.*	90	102	24	
		n	Electric current, 20 sec., coil at 70 *mm.*	94	130		
35	1	n	Electric current, 10 sec., coil at 60 *mm.*	70	82	8	
		c	Electric current, 10 sec., coil at 60 *mm.*	68	72		
36	5	c	Electric current, 20 sec., coil at 70 *mm.*	90	98	26	
		n	Electric current, 20 sec., coil at 70 *mm.*	94	128		
37	5	c	Electric current, 10 sec., coil at 70 *mm.*	98	100	14	
		n	Electric current, 10 sec., coil at 70 *mm.*	96	112		

IRIS.

Obs.	Animal No.	Eye.	Irritant.	Begins.	Rises.	Difference.	After.
38	3	n	Pinched forcibly with forceps.	60	100	10	
		c	Pinched forcibly with forceps.	50	80		
39	3	c	Drew out through small opening.	56	62	6	
		n	Drew out through small opening.	50	62		
40	3	c	Drew out.	48	60	16	
		n	" "	52	80		
41	3	c	Drew out larger piece.	54	64	37	
		n	" " " "	52	99		
42	2	n	Iridectomy.	54	74	10	
		c	"	56	66		
43	5	c	"	90	102	10	
		n	"	98	120		
44	4	c	"	64	80	8	
		n	"	66	90		
45	2	c	Electric current, 5 sec., coil at 25 *mm.*	60	82	2	
		n	Electric current, 5 sec., coil at 25 *mm.*	60	84		
46	5	n	Electric current, 20 sec., coil at 70 *mm.*	82	138	4	
		c	Electric current, 20 sec., coil at 70 *mm.*	80	132		
47	2	n	Electric current, 2 sec., coil at 10 *mm.*	58	78	6	
		c	Electric current, 2 sec., coil at 10 *mm.*	60	74		
48	5	c	Electric current, 10 sec., coil at 70 *mm.*	82	136	10	
		n	Electric current, 10 sec., coil at 70 *mm.*	80	144		
49	2	n	Electric current, 10 sec., coil at 75 *mm.*	62	88	14	
		c	Electric current, 10 sec., coil at 75 *mm.*	70	82		
50	3	n	Electric current, 2 sec., coil at 20 *mm.*	60	78	15	
		c	Electric current, 2 sec., coil at 20 *mm.*	78	81		
51	2	n	Electric current, 5 sec., coil at 10 *mm.*	56	84	16	
		c	Electric current, 5 sec., coil at 10 *mm.*	62	74		
52	1	n	Electric current, 15 sec., coil at 60 *mm.*	68	90	18	
		c	Electric current, 15 sec., coil at 60 *mm.*	70	74		

This effect, however, is only slight as to degree, and very evanescent. In one case the response to the irritant showed a difference at one trial, but not at another applied a minute or two later. The effect with a full dose, however, begins much sooner and lasts a longer time. A two-per-cent. solution has produced a degree of anæsthesia in a rabbit's eye equal to one sixth of total insensibility within three minutes after it was instilled. The greatest degree is reached, on the average, within the first quarter-hour, and in about twice that time has begun to subside.

The repetition of the application increases the anæsthesia in a marked degree. Thus, if two drops of a one-per-cent. solution are repeatedly instilled at intervals of half a minute for five minutes, the effect is, on the average, about one fourth greater than when four drops of a three-per-cent. mixture are instilled as closely together as possible to prevent their flowing out between the lids. Concerning the anæsthesia as related to the mydriasis, the former, when present, always precedes the latter, even when small doses are used.

(*c*) AS TO THE DIFFERENT PARTS OF THE EYE.

The anæsthesia is shown first in the conjunctiva and cornea. The average of seven trials would indicate that it appeared to a perceptible degree in the lower cul-de-sac earlier than in the upper, or in the cornea. The difference, however, is very slight, if it does exist, in reality. The amount of insensibility produced is much greater in these two external portions than in the iris. After a four-per-cent. solution has been dropped into the conjunctival sac, and a sufficient time for absorption allowed, if the aqueous humor be removed and dropped into the eye of a second animal, the anæsthesia and dilated pupil indicate its presence there. In other words, it reaches the iris by passing through the cornea.

In conclusion, it is but right to speak of the many sources of error that must be taken into account. At the first glance, for example, it will be seen from the tables given, that in some instances there was absolutely no difference in the blood pressure, in the two eyes, when irritated. In

these cases—*e. g.*, Nos. 10, 21, and 22—the less than minimum dose or more than maximum time accounted for the apparent failure. In every instance, however, it was necessary to give the figures just as they were read off, although sometimes they were seemingly contradictory. Instead of lengthening this paper further, these points—many of them of interest—are passed in silence. The general line of the study is clear enough, and the conclusions show that it is not altogether impossible to obtain a numerical expression for the degree of anæsthesia produced by cocaine.

CASE OF MORGAGNIAN CATARACT (FLUID HYPERMATURE) WITH TRANSPARENT FLUID CORTICAL.

By G. A. NORDMAN,

ASSISTANT PHYSICIAN, UNIVERSITY OPHTHALMIC CLINIC IN HELSINGFORS.[1]

Translated by J. H. SHORTER, M.D., New York.

IN Morgagnian cataract, as all know, the fluid cortical ordinarily is of the nature of an emulsion, and so muddy that the light-perception is more diminished than in other forms of cataract; at the same time the lens capsule is, to greater or less extent, also often the seat of cataract. A case in which the fluid cortical as well as the lens capsule is entirely transparent and limpid, and in which, as a consequence, the acuity of vision is only slightly altered, should deserve to be published an account of its rarity.

It seems that cases with limpid liquid cortical have, thus far, not been known. Morgagni, it is true, described one of this kind as follows: " Is parvus erat (that is, the lens as taken from the globe) secundum omnes dimensiones, crassitudine autem vel paulo minor quam ejusmodi oculo conveniret. Facie anteriore in medio erat albus, sicuti per corneam transpexeram; cæteralbidus; et cum inter digitos leviter cumprimerem, mollis. Cum vero ejus tumicam incidere cœpissem, continuo aqua erupit, nihil purulenti habens, imo pura et limpida, eaque copia pro parvitate crystalli ut hic statim ad multo minorem crassitudinem redigeretur. Quidquid de

[1] The case was presented and demonstrated before the Congress of Finnish Physicians on 14th Sept., 1883, and a description of the same appeared in the 2d vol. of the " Finska Läkaresällskapets Handlingar," in 1884.

substantia ipsius reliquum fuit, lentis pristinam figuram retinuit."

Since this, however, there has been no other case reported, and Otto Becker, with his great experience and most extensive acquaintance with the literature of the subject, does not mention any similar case in his latest work, "On the Anatomy of the Normal and the Diseased Lens," Wiesbaden, 1883. He seemed also to be in doubt, from the very fact that the liquid cortical was clear, how far Morgagni's description, as given above, could apply to a so-called Morgagnian cataract of the present time. In connection with the question by whom and to what form of cataract the title "Cataracta Morgagni" was first employed, he repeats the passage from Morgagni regarding it, in his monograph on the "Pathology and Therapeutics of the Lens System" in Graefe–Saemisch's "Handbuch," volume v., page 265, and adds: "This case can be considered, without further discussion, as that which we now call a Morgagnian cataract; we have the capsular cataract, a fluid cortex, and a regularly circumscribed nucleus suspended in it. One thing only does not correspond: that is, that the outflowing liquid is clear and not turbid." Now, as the case which I am about to report shows that in a Morgagnian cataract the fluid cortical does not of necessity require to be opaque, it can be taken without doubt that Morgagni's description applies also to cases of this kind.

The case observed by me occurred in a peasant of "Sawitaipal," Abel Adamsson Natko, fifty-five years old, of strong build, and good general health. He had always had good eyes and enjoyed good sight, until recently, in 1879 when the eye in which the Morgagnian cataract is now present was diseased for a couple of weeks. The nature of the disease cannot be determined from the description of the patient. The eye, however, under medical treatment was quickly cured, and, as the man distinctly asserts, without any diminution of sight. But in October, 1882, the visual power commenced to diminish, and without any preceding pain or symptom of inflammation, according to his statements, simultaneously in both eyes. The diminution of sight was so rapid, that already by New Year, 1883, he could no longer read, and in a short time thereafter could no longer get about without help.

In the spring of the same year he could, however, see again decidedly better, so much so that he could find his way alone though with difficulty.

On the 20th of August, 1883, he sought admission to the eye clinic on account of the trouble of his eyes. On examination all the internal organs were found to be healthy. Especially may be mentioned that the heart and vascular system were normal, and the urine contained neither albumen nor sugar.

In left eye he had ordinary, almost mature senile cataract, which was operated on by me with good result. V with + 11 D = $\frac{6}{18}$. The extracted nucleus had a diameter of 8.5 *mm.* and was 4.5 *mm.* thick.

It may be remarked regarding the operation that the vitreous appeared thinly fluid, and that in the operation a moderate amount of it was lost.

The right eye presented the following conditions: the external parts of the eye healthy; the ant. chamber deep; the iris somewhat atrophic, so that it reacts only imperfectly under atropine; the pupillary border is finely indented and is tremulous by the least movement of the eye.

In the lower part of the pupillary space, the lens nucleus, about 5 *mm.* in diameter, is seen, and above the latter the black pupil. The outer layers of the nucleus seem a dirty white, but the centre presented a yellowish-brown reflex.

By closer examination there could be seen, in addition to this in the pupillary area, and especially distinctly by focal illumination, a quantity of very fine, sharply bordered, almost chalk-white dots, which remind one of the dotting of Descemet's membrane in iritis serosa, and which might be regarded as deposits from the fluid contained in the posterior surface of the ant. lens capsule, but which might also depend on some local trouble in the capsule itself, although from the picture which the fine dots presented this explanation does not seem to be valid.

When the patient bowed his head to one side, the nucleus would sink immediately in the same direction; when he inclined the head forward, the nucleus lay directly on the iris; on bending backwards, the nucleus would also sink back, though apparently not more than 1.5 *mm* at most.

Above the nucleus by ophthalmoscopic examination a tolerably distinct image of the fundus was obtained. The latter was normal.

As mentioned above, the vision of the patient, which had formerly diminished to that which is usual in cataract, had in

this eye become so much restored that since spring he had been able to get about without help.

He had not used glasses, and without them his present vision was not better than counting fingers at 2.5 metres, but with convex 10 D, vision is $\frac{6}{30}$, and by employing a stenopæic hole or slit it improves to $\frac{6}{8}$.

This great difference in vision, according as the test is made with or without artificial shading, does not depend, however, or, if so, in a very small degree, on astigmatism ; for he sees equally well in whatever meridian the slit may be held, but it depends on the large circles of diffusion which must naturally arise in consequence of the very irregular shape of the pupil.

In examining the vision for the near, a phenomenon appeared which seemed to me peculiarly noteworthy. In repeated tests for reading, the patient chose always the strongest glasses. With + 18 D, when this was associated with artificial shading, he could read Jäger No. 2 at 8 inches. With weaker glasses he read worse, and only coarser print.

With the other eye, which had been operated on for cataract, in which the vision for distance was sharpest with + 11 D, he read best with + 14 D. That the eye with Morgagnian cataract should see best for near with such a strong glass, when it might be expected that + 13 or + 14 would be most suitable, can only depend on the fact that the lens, which is here so greatly altered, effects the accommodation in a highly abnormal manner, and in a way very unfavorable to distant sight on the part of the patient. This supposition must also be regarded as very reconcilable with the mechanical conditions.

If the zonula is relaxed the normal lens, on account of its proper elasticity, assumes a more convex shape. Here, on the contrary, where the lens represents a sac filled chiefly with liquid, the latter when exposed to the stretching of the zonula must represent a lens with higher refractive power than if the zonula was relaxed and the shape of the sac was really determined by the intra-ocular pressure.

This explanation of the appearances would have been, according to my opinion, entirely satisfactory, even if the phenomenon had not also been observed during entire atropinisation of the eye —that is, paralysis of the ciliary muscle. I can therefore explain the occurrence to myself only in this way : that, in the peculiar conditions present, some other force besides the contraction of

the ciliary muscle must be able to take part in the accommodative change in the shape of the lens.

That the case is one of Morgagnian cataract, even if with transparent liquid cortical, is without doubt, and this is also the opinion of Professor F. J. von Becker, the director of the clinic, who likewise examined the eye.

The course of the disease corroborates this assumption, for the vision improved after the cortical became fluid and again transparent; the examination of the case in the present status confirmed it likewise.

The sole affection with which it might possibly be confounded would be a luxated cataractous lens, which, at first sight, it much reminded me of. It had the iridodonesis in common with this, and the nucleus, in one case, could represent the lens, which in luxation is often more or less rudimentary. But still there were peculiarities which distinctly distinguished it from this affection.

In observing closely by focal illumination the respective behavior of the nucleus and of the before-mentioned fine dots, one sees that the latter always preserve the same situation in the pupillary area, even when the nucleus changes its position, and that they always remain in the plane of the iris, when the nucleus sinks backward. In case of a luxated lens, the dots which lie outside the nuclear area are seen as lying on the zonula of Zinn, and must of necessity change their position as well in a vertical as in a horizontal direction so soon as the lens changes its position. This, as stated, not being the case here, the dots must lie on the capsule, and the capsule separated by a large quantity of clear liquid cortical from the nucleus when the nucleus sinks backward.

Another circumstance which likewise supports the diagnosis is this, that the other eye had an ordinary senile cataract, while lens-luxation is almost always binocular.

Operative treatment of the case could hardly come in question, and the patient was discharged on 15th September.

As the sight, which had been reduced very much by the cataract, was spontaneously very much restored the case may certainly be regarded as a successful attempt on the partof nature to cure cataract.

PARTIAL EMBOLISM OF THE ARTERIA CENTRALIS RETINÆ AND ITS BRANCHES.

By Dr. SCHNABEL, Professor, and Dr. THEO. SACHS,

ASSISTANT, AT THE OPHTHALMOLOGICAL CLINIC IN INSPRUCK.

Translated by Dr. Morris L. King, of New York City.

EMBOLISM, as a whole, is as well understood as any part of general pathology, but we are yet far from understanding clearly all the clinical symptoms accompanying or causing embolism of the central artery of the retina. The anatomical relations of this artery are well known, and for this reason it would seem to be easy to prognosticate the consequences of its occlusion, if the size, variety, and seat of the embolus are given. We are not obliged to wait for an autopsy to get the data as to the changes in the vessels and retina which follow embolism of this artery, but we are fortunately able not only to observe them from the beginning, but to see them considerably magnified. This disease is not very rare, and the literature of the subject will show a large number of cases that have been carefully observed and accurately reported. But even with all these advantages, it was so difficult to explain the matter satisfactorily, that even as late as 1870 v. Stellwag doubted the fact that embolism of the central retinal artery ever took place.[1] In 1873 Mauthner[2] declared that in the majority of these cases, there was another disease present, which had as yet not been recognized, and only lately Hirschberg

[1] "Lehrbuch der pract. Augenheilk.," 1870, page 249.

[2] Zur Lehre von der Embolie der Arteria centralis Retinæ, *Wiener med. Jahrb.*, 1873, Bd. ii., p. 10. Separat-Abd.

stated that for the present many of the most important facts must remain undecided, although the pathological anatomy of the subject was quite clear.[1]

Total, permanent occlusion of the trunk of the central retinal artery must necessarily be followed by permanent absence of blood and consequent death of the nerve layer of the retina, unless a collateral circulation be established through the vessels of the ciliary system.

In the optic disc, as is well known, there are anastomoses between the central and ciliary arterial systems. But it has also been shown that these anastomoses are too few and too small to completely take the place of the occluded central artery.[2]

Many ophthalmologists assume that the numerous retinal vessels which emerge from the lateral edge of the papilla itself, or even from the ring of connective tissue about it, and which have no apparent connection with the main trunk of the artery or its branches, originate in the ciliary system, and that these so-called cilio-retinal vessels may take the place of the occluded central vessel. But up to the present no one has been able to demonstrate that these cilio-retinal vessels are correctly named. Heinrich Müller and Nettleship have made longitudinal sections of the optic nerve, which show small retinal vessels passing over the edge of the optic papilla, whose origin in the central artery is not to be seen.[3] The attempt to show that these vessels originate in the central artery have, therefore, not been successful, but at the same time it has not been demonstrated that these vessels belong to the ciliary system. Those who deny the origin of these so-called cilio-retinal vessels in the central artery, simply because the connection between the two has never been seen, should be careful not to commit themselves by asserting that they belong to the ciliary system, because their connection and origin in this set of vessels have

---

[1] Ueber Embolie der Netzhautarterie, *Centralbl. für Augenheilk.*, 1884, p. 1.

[2] Leber: Bemerkungen über die Circulationsverhältnisse des Opticus und der Retina, *v. Graefe's Archiv*, Bd. xviii., 2, page 32, und Graefe-Sæmisch's "Handbuch," Bd. ii, page 307; vol. 2, page 547.

[3] H. Müller: *v. Graefe's Archiv*, Bd. iv., 2, page 10. E. Nettleship in *British Med. Journal*, Feb. 5, 1876. "Ophth. Hosp. Rep.," vol. viii., page 512; and vol. ix., 2, page 161.

never been seen either. Until some one succeeds in demonstrating satisfactorily the whole course of one of these cilio-retinal vessels, it will be well to assume that they are abnormal branches of the central artery and not an abnormal ciliary vessel.

In order to explain the clinical symptoms of embolism of the central artery, many authors have been forced to assume that there was free communication between the retinal and choroidal vessels. Such connection has never yet been seen, although many thousand eyes have been carefully dissected, and it therefore seems rather questionable to assume that such connection did exist in just those cases in which its presence would enable the observer to explain the symptoms which appear. If we consider the embryonal development of the part, we are forced to disbelieve any statement which assumes that one or more vessels pass out from the choroid, through the hyaline membrane and the posterior retinal layers, and anastomose with the branches of the central artery of the retina.

Our knowledge of the anatomy of the vessels of the retina has not yet shown how the retinal vessels would be filled with properly circulating blood, after the central artery had been completely occluded. We must, therefore, endeavor to see whether there is not reason to believe, judging from clinical facts, that our anatomical knowledge of the vascular system of the retina is not yet complete, and that there is reason to believe that the anastomoses in the optic papilla, between the ciliary and retinal vessels, may be sufficiently numerous and large to compensate for the occluded central artery, and that there is a connection between the so-called cilio-retinal and ciliary vessels, and that in many cases large connecting branches convey blood from the choroid to the retina. It would not be the first time that clinical facts had indicated anatomical relation hitherto unrecognized, and that subsequent investigation, directed to the point in doubt, had shown the supposition to be correct.

Clinical observation of cases of embolism of the central artery of the retina, in which the retinal vessels again

become full, and circulation was established shortly after the occurrence of the embolism, refute the assumption that the dilated vessels of the sclerotic margin have taken the place of the occluded central artery. Experience shows that after ligation of an artery the collateral circulation, which carries blood to the occluded branches, is the least active just after the ligation, and gradually becomes more and more efficient by gradual dilatation of the smaller vessels, until at last it completely suffices. In the earlier cases of embolism of the central artery, there was sudden absence of blood, followed in several hours by a normal dilatation of the vascular system with blood, which, however, disappeared several days later, and was followed by very marked atrophy of the vessels. We will later on describe several such cases. The literature of the subject contains many of them, and every ophthalmologist of experience will assuredly remember similar cases in his own practice. If, in these cases, the connection between the central and ciliary vessels in the optic papilla were large enough to fill the branches of the central artery with circulating blood, but few hours after the occlusion, it would be unexplainable why these connections between the two vascular systems became contracted later on, and why this contraction proceeded very rapidly until there was marked atrophy of the vessels of the central vascular system. It should also be noted that during the primary congestion, the color of the papilla is the same as when the vessels are refilled, which does not uphold the supposition that the branches of the scleral vascular circle furnished the blood for refilling the retinal vessels.

Since oculists had begun to assume that these small retinal arteries, which project from the papillary margin towards the macula without apparent connection with the central artery, are ciliary vessels, there have been three cases of embolism of the central artery described, in which the so-called cilio-retinal vessels were present. In all of them circulation reappeared, and there was partial restitution of vision. While one of these cases was reported by Prof. Hirschberg, who doubts the cilio-retinal origin of these little

vessels, and who particularly remarks that their presence did not seem to have the least influence on vision,[1] Benson and Birnbacher ascribed a considerable influence to these vessels in the formation of the ophthalmoscopic appearances and the condition of vision.[2] All of these observers found that those parts of the retina supplied by these vessels retained their normal appearance, while the neighboring parts presented the well-known hazy appearance peculiar to embolism. If the above conditions were only explainable by assuming that these unoccluded arteries originated in the ciliary vessels, then we would be obliged to agree with Benson and Birnbacher, and acknowledge that they had presented a plausible argument in favor of the connection of the cilio-retinal vessels with the vascular system of the choroid. As a matter of fact, the ophthalmoscopic appearances seen by both writers were entirely similar to those seen in embolism of single branches of the central artery. From the fact that within a short time two cases of embolism of the central retinal artery have been reported, in which there was no interference with the circulation of blood in the so-called cilio-retinal vessels, we may only assume that, in all probability, these vessels originate from the main trunk before the latter reaches the lamina cribrosa, which is the usual seat of the embolism. From the fact that there is no change in calibre in these so-called cilio-retinal vessels either before or after the restoration of circulation in the retina, Birnbacher assumes that they originate in the ciliary arteries. This argument is not convincing. We are justified in assuming that a sudden hyperæmia of the ciliary vessels would follow the plugging of the central artery, and that during the continuance of this embolic hyperæmia of the retinal vessels of normal origin, there would also be a congestion of the retinal vessels originating in the ciliary system, which is just contrary to the conclusion arrived at by Birnbacher.

[1] Ueber Embolie der Netzhautarterie, *Centralbl. für pract. Augenheilk.*, 1884, p. 77.

[2] Benson: Embolism of the central artery of the retina modified by the presence of a cilio-retinal artery, "Ophth. Hosp. Rep.," vol. x., t. iii., p. 336. Birnbacher: Ein Fall von Embolie der Arterie cent. Ret. bei vorhandenen cilio-retinal Gefässen," *Centralbl. für pract. Augenheilk.*, 1883, p. 207.

In Hirschberg's case of embolism, in which there was a cilio-retinal artery, the latter underwent the same changes to a certain degree, as did the remainder of the retinal vessels; it became thread-like, and in this manner distinctly showed that it had its origin in the central artery. We have only to state that these so-called cilio-retinal vessels are exactly similar to the remainder of the arteries seen with the ophthalmoscope, except that their origin in a large trunk is not visible, and that they are entirely different from the choroidal vessels, to show that the existence of retinal vessels of ciliary origin is neither justified by clinical facts nor by anatomical investigation. Continued investigation may, perhaps, show that such vessels do occasionally exist. In reference to this possibility it may be well to state that the presence of such cilio-retinal vessels in an eye in which the central artery was completely plugged, could have no other effect than to preserve the integrity of that part of the retina supplied by them. The capillary connections between the normally filled vessels of ciliary origin and the collapsed retinal arteries of central origin could not transmit a quantity of blood sufficient to nourish the affected parts, as is proven by that class of cases in which that part of the retina supplied by the plugged vessel remained insensitive, although the capillaries of the plugged artery were in direct connection with those of normally filled neighboring vessels. Clinical observation does not give any reason to assume that there are large anastomoses between the choroidal and retinal vessels. No one has as yet succeeded in demonstrating ophthalmoscopically such a connection in any normal eye, and not even in those few cases of embolism for which this hypothesis was originated, could such a connection be demonstrated. In a case of embolism of a branch of the central artery, Knapp saw a considerable dilatation of the vessel just posterior to a partially empty part of the occluded vessel, and thinks that this dilatation may have been caused by the entrance at that point of a ciliary artery.[1] It is not necessary to assume so improbable

[1] Embolism of a branch of the retinal artery with hemorrhage in farctus in the retina. These ARCHIVES, Vol. i., No. 1, p. 64.

a state of affairs, for it is easy to see why the column of blood should seem smaller in a limited area, the lumen of the vessel being partially filled by an embolus and its walls thickened and closed by inflammatory softening, while behind this part the vessel had its normal appearance, the lumen being pervious and the walls not inflamed. All those authors who declare that the restoration of normal circulation in the branches of a plugged central artery depends on the presence of copious anastomoses between the retinal and choroidal vessels, support their view by quoting cases in which there was a sudden increase in calibre of a retinal vessel which was abnormally thin in part of its course, leaving out of consideration the fact that local changes in the walls of the vessel may cause the same irregularity in the apparent size of the column of blood in neighboring parts of the same vessel.

The following case will show how unsafe it is to assume that, because after embolism of the central trunk a retinal artery is only filled with blood at a certain distance from the papilla, and the central portion appears like a white band for the distance of several diameters of the disc, the central portion is impervious, and that the peripheral part is fed from a choroidal artery.

CASE I.—Stephen B., aged seventy-six and a half, came to the clinic of Prof. von Jaeger in June 13, 1875, because two and a half months ago he had suddenly become blind in the right eye. The sharply defined papilla was pale, of a dirty green color, and slightly excavated. The veins on the papilla were somewhat smaller than normal and had no reflex, but in the retina they were of normal width and provided with reflexes. The trunk of the central artery was hardly to be recognized as a light, ill-defined line. The arterial branch passing upwards is well-filled from the centre provided with a reflex streak; the remaining five arteries visible on the papilla appeared as flat, white bands. The latter extend over the edge of the papilla, and at a distance of from one to one and a half papilla-diameters assume the color of ordinary arteries with reflex streaks, but remain somewhat narrower than normal arteries. On pressure on the globe the artery on the papilla which was filled with blood became empty, without

the appearance of pulsation; on relieving the pressure, a narrow thread of blood appeared in the centre of all the white bands which represented arteries, extending from the centre of the papilla to the spot where these arteries presented a normal appearance.

While we could hardly assume that five retinal arteries were supplied with blood from the choroidal vessels by means of invisible anastomoses, the results produced by pressure on the globe clearly demonstrate that the white arterial bands were pervious to blood, and that their contents were invisible only because their walls were thickened and clouded.[1]

From the above observations it will be seen that we are at present not able to imagine how circulation can be restored in a retina whose central artery is completely occluded by an embolus.

We are therefore forced to assume that in that class of cases of embolism of the central artery or one of its branches, in which shortly after the occurrence of embolism the blood again circulates in the diseased district, the plug either did not entirely fill the lumen, or, at least, after a short time ceased to fill it completely.

Following the example of Schneller and Knapp, Leber declared it probable that in those cases in which embolism was soon followed by a dilatation of the vessels, with an increase in vision, the embolus did not entirely occlude the lumen of the vessel.[2] Mauthner, on the contrary, says that the diagnosis of partial occlusion of the central trunk is to be made with caution, because, as has been shown by past experience, a very small continuous arterial

---

[1] Pressure on the eye shows that by massage an increased amount of blood can be sent to the retina, and thus, perhaps, remove a soft, fresh embolus, or break it up and render it innocuous. In similar cases, the papilla could be seen to become rosy on discontinuing the pressure, and invisible vessels came in sight, and straight arteries became tortuous. By resorting to pressure twice, Wood-White caused a typical case of embolism and blindness to disappear. (Embolism of art. cent.; re-establishment of circulation witnessed with the ophthalmoscope. The *Ophthal. Review*, edited by K. Grossmann, etc., vol. i., Jan., 1882.—*Centralbl.*, 1882, page 303.)

[2] Schneller: Fall von Embolie der Central-Arterie der Netzhaut mit Ausgang in Besserung, *v. Graefe's Arch.* Bd. viii., p. 273. Knapp: Ueber Verstopfung der Blutgefässe des Auges, *v. Graefe's Arch.*, Bd. xiv., p. 217. Leber: Graefe-Sæmisch's "Handbuch.," Bd. v., p. 544.

supply is sufficient to nourish and preserve the integrity of the retina, as is shown in so many cases of neuritis optici and in ischæmia of the retina in the asphyctic stage of cholera; and further, because an interrupted stream of blood, as in the arterial pulse, does not necessarily cause a loss of vision; and further, it is hardly possible to suppose that an embolus would attach itself to the wall of any vessel in which it did not fill the whole lumen, but that it would be carried on by the blood-current until it reached a place where it filled the whole lumen. Cases of optic neuritis in which there are apparently[1] small columns of blood in the retinal arteries, combined with good vision, are not uncommon, but apart from the fact that the visible width of the column of blood cannot be said to be identical with the true one, we must also consider that in partial embolism the vessels are emptied at once, while in neuritis this occurs slowly, thus having its influence on the consequences of the resultant anæmia.

In cholera patients the thickened blood flows more slowly through the retinal vessels than in cases of partial embolism of the central retinal artery, but in the first case the decrease in quantity and rapidity of circulation of the blood will not be as detrimental as regards the nutrition of the retina, as in the latter case, because the cholera-ischæmia is caused by decrease of the blood serum, while in embolic ischæmia the composition of the blood circulating through the retinal vessels has undergone no change, the proportion of red globules and quantity of albumen being less in the same proportion as the serum.

The fluctuation of the blood circulation in the retina, caused by the heart's action, as is shown by the arterial pulse in cases of increased intra-ocular pressure, very rarely has any appreciable influence on the acuteness of vision, as we often find the vision of glaucomatous eyes is as great during the time the pulsations continue as during the intermission which takes place spontaneously or after the use of eserine. The continuous circulation of a small quantity of blood under low pressure, as is the case in partial embolism of

[1] *L. c.*, p. 3, des Separat-Abdrucks.

the central artery, must necessarily have a different effect on the nutrition of the retina than the temporary decrease in the quantity of intra-ocular blood which occurs only during the diastole of the heart. There is finally no difficulty in imagining an embolus of the shape of a little leaf or lump, whose corners may become engaged in the wall of the vessel, the blood then passing by its irregular corners. That the embolus shall consist of a soft, flexible, nearly round mass, which is forced along the vessel by the blood-current until it lodges and fills up the whole lumen like the cork of a bottle, is only one of many possible cases, it is not at all necessary to assume that this is the only one which really occurs.

Of much more importance than Mauthner's objections is a fact which Leber has advanced against the view of partial embolism. One would suppose that a partial embolus in the central artery or any of its branches would soon completely fill the vessel by the formation of a thrombus.[1] Leber expected to settle this point by experiments and autopsies, but up to the present it has been impossible to find a single case in which it can be shown that an embolus partially occluding the retinal arteries may remain for months without causing a total stoppage of circulation by the formation of a thrombus. Later on we shall give the results of such an examination. Even at the time Leber made the above statement there was no lack of experiments which went to prove that emboli did not in all cases give rise to thrombi; such cases were also known to have occurred in the human being. Cohnheim found that thrombi never formed about emboli which were introduced in the arteries of the frog's tongue, be the emboli of whatever size and quality they might.[2] He acknowledges that he is unable to definitely explain why such should be the case, and ventures the suggestion that perhaps the unchanged vessels in the frog's tongue are too small to allow the formation of a thrombus about a foreign body. It is also the case in human pathology, that thrombi are never seen in vessels be-

[1] Graefe-Saemisch's "Handbuch," Bd. v., 2, p. 548.

[2] Untersuchungen über die embolischen Processe, p. 10.

low a certain size, even under circumstances which favor the coagulation of the blood in the body, and which at the same time has caused thrombi to appear in vessels of larger calibre.[1]

There are no facts in pathology which would indicate that a partial embolism of the arteria centralis retinæ or its branches might not occur, but there are many which render such a thing quite probable. We may therefore assume such to be the case generally, and not only, as Leber suggests, in that class of cases in which vision is restored simultaneously with the circulation. All cases of embolism followed by a restoration of circulation should be put in one class, and the fact that the function of the retina is also restored must have no influence on this classification. Mauthner does not recognize the diagnosis of partial embolism of the central artery, and is therefore correct in saying that all cases in which a later though transient dilatation of the vessels had been observed, were not to be considered as embolism of the central artery.[2] If these cases of sudden loss of vision, occurring in patients with heart disease, and in which the ophthalmoscope indicates great ischæmia of the papilla and retina, followed by rapid atrophy of the whole retinal vascular system, are not cases of embolism, what are they? Mauthner does not give any opinion on this point. If the embolic nature of these cases is denied, it is impossible to form any clear idea as to their true nature. Whoever accepts Mauthner's view must perforce consider that the majority of diagnoses of reported cases of embolism are incorrect, without furnishing a correct diagnosis in their place. This unfortunate fact should not in itself be any argument against Mauthner's view. It may be shown, however, that Mauthner argues from a false standpoint in assuming that the well-known clinical history of embolism of the central artery is caused only by complete and not by partial closure of the lumen of the vessel, and for this reason symptoms which do not agree with a diagnosis of total closure of the vessel, militate against the

[1] Cohnheim, *l. c.*, p. 10.
[2] Cohnheim, p. 11, des Separat-Abdrucks.

diagnosis of embolism ; especially is this the case as regards restoration of the normal circulation of the retina. The following history of a case of this kind, together with the result of the autopsy, proves that partial closure of the central trunk by an embolus produces a set of symptoms which in all respects are similar to those caused by complete stoppage of the circulation, and thus removes all doubts as to the embolic origin of that class of cases in which the clinical picture of embolism of the central artery is combined with a rapid restoration of the circulation, and also removes all necessity for assuming the existence of an extraordinary connection between the retinal and choroidal vessels.

CASE 2.—Paul G., aged thirty-three, entered Professor Rokitansky's service on July 20, 1883. He had already been treated in November, 1881, for endo-carditis, with slight general systolic murmur. Up to June, 1883, he was able to follow his arduous calling of mountain guide. After that when he made long journeys he suffered from very severe palpitation of the heart, want of breath, so that he was often obliged to stop and rest. Later he had profuse epistaxis, and after several attacks he was quite anæmic. On August 26th, at 7 P.M., while on the way from the hospital garden to the ward, he was seized with a very severe palpitation of the heart, followed by a feeling of heat, and before he could reach the ward, every thing turned black before the left eye. He compared the palpitation to " the working of a machine in the chest." After he had got to bed all the symptoms disappeared excepting the blindness.

On August 27th, at 10 A.M., Prof. Sachs examined the patient for the first time. The patient, who was highly anæmic, could hardly remain erect. The heart is enlarged in both the short and long diameters, more so in the latter ; the cardiac impulse is heaving, and on exercise is combined with a " frémissement." At the apex is heard a slight systolic murmur, and over the aortic valves are two loud murmurs. The spleen is enlarged and palpation in that region is painful ; lungs are normal. Slight amount of albumen in the urine.

The left pupil is somewhat larger than the right, only reacting consensually. Tension slightly decreased in the left eye. Media clear. Papilla pale, gray-blue, outline indistinct in all directions,

especially downwards. In the centre of the papilla the retinal vessels are contracted to rosy, thread-like twigs, and the arteries and veins cannot be distinguished. On a small vessel passing downwards a yellowish-white spot can be seen just below the edge of the physiological excavation. Even at the edge of the papilla the vessels seem to be fuller and arteries and veins can be distinguished. In the veins, excepting the largest, the inferior temporal, the column of blood seems to be composed of alternate red and light parts. No motion can be observed in these columns of blood. The cloudiness of the retina extends somewhat beyond the papillary margin in an upward, inward, and downward direction, and laterally it extends in the shape of a bluish-white cloud, on which the fine vessels in the macular region are remarkably distinct. In the vicinity of the fovea centralis there is a small, rectangular red spot. Amaurosis. Right eye is normal.

Nine hours after the first examination, that is, about twenty-four hours after the loss of sight, the ophthalmoscopic appearances had changed considerably. The arteries had again reached normal size, and the reflexes had also appeared. It could now be seen that the white spot seen in the morning was attached to the lower main arterial trunk. The latter was of the same width above and below the spot. The veins contained more blood than in the morning, but they were still smaller than the arteries. All the veins became more attenuated towards the papilla; the end of the superior nasal vein was invisible. In most of the main venous trunks the column of blood was divided into small cylinders by numerous light spots; the blood in the veins moved slowly towards the papilla, the movement being observed as far as the centre of the papilla. This condition of the blood could not be seen in the inferior temporal vein. The cloudiness of the retina and the red spot in the vicinity of the fovea centralis were unchanged. Tension was still decreased.

Aug. 28th.—The veins still continue smaller than the arteries, becoming narrower toward the centre of the papilla. The column of blood in the veins is still marked by the light spots, but no further movement is noticed. The rectangular red spot in the vicinity of the macula has increased in size, is more circular, and of a darker hue than yesterday. Its diameter now is about one fourth the diameter of the papilla.

Aug. 29th.—Movement of blood in the veins again visible. The apparent divisions in the venous blood-column are not visible

now, but there are alternate light and dark-red spots. The reflexes of the venous blood-columns are very indistinct. Tension is still decreased.

Aug. 31*st.*—At noon there was a sudden blinding of the right, apparently healthy, eye. It lasted only a few minutes, and left a slight indistinctness of vision. Ophthalmoscopically the only anomaly seen was an oblong yellowish-white spot, situated about two papilla-diameters from the disc covering one of the columns of blood; the latter, which could still be seen, seemed to be of normal width. Accurate ophthalmoscopic and glass tests cannot be made, because of the great weakness of the patient. It is only shown that the patient can read small print, and that there is no defect in the visual field. In the left eye a small extravasation of blood has appeared at the upper and outer edge of the papilla. There is no recognizable circulation in the veins.

Sept. 2d.—Blood-columns in the veins are interrupted, but there is no visible motion. The extravasation has disappeared. No change in the ophthalmoscopic appearances of the right eye.

Sept. 8th.—During the last few days the patient could not be examined because of great weakness. There is but little cloudiness of the retina. The red spot in the vicinity of the macula could only be recognized as an indistinct, brownish-red patch. The macula was surrounded by numerous small shining specks. All vessels narrower than normal, and filled with uninterrupted columns of blood. Patient thinks his power of vision in the right eye is normal. Ophthalmoscopic appearances in the right eye are the same.

Sept. 15*th.*—Cloudiness of the retina in the left eye has disappeared.

Nov. 22*d.*—Left eye: papilla is pale, vessels considerably contracted, arterial pulse is easily produced. On the papilla is the yellowish-white spot already mentioned, which is concave anteriorly, with a turned-up edge. About the macula are light specks arranged in star-shaped groups. Right eye: the dazzling white spot is still present, except that the fundus seems normal.

Patient died on Dec. 1, 1883. Forty-eight hours later Prof. Schott made the autopsy, and found eccentric hypertrophy of the heart, with insufficiency and stenosis of the aortic valves, insufficiency of the mitral valves, hypertrophy of the lungs, infarctions in the spleen and left kidney, peritonitis, and ascites. The heart was twice the normal size and disc-like. The heart-muscle was

pale; the aortic valves were depressed, so that the greater part of the sinuses of Valsalva were exposed. The middle segment of the valve was represented by a band about 3 *mm.* wide, on whose free margin there were proliferations the size of a pea, coarse to the touch. On the right segment there were numerous coarse, pale-yellow proliferations, like a cock's comb, below which was a rent about 4 *mm.* long by 3 *mm.* wide.

In the spleen were found six infarctions, some very red, some yellowish-red, and some of a light-yellow color. On the convex edge of the left kidney was a cicatricial contraction, corresponding to an old infarction.

The bulbs of the eyes were removed together with the optic nerve as far as the chiasm, preserved in Müller's fluid, hardened in alcohol, and by means of the microtome were divided in an uninterrupted series of sections. Microscopic examination resulted as follows:

1. In the central artery of the intra-ocular part of the left nerve, just at the lamina cribrosa, was an embolus, whose long diameter was about twice the transverse diameter of the artery. It was partly hyaline, partly finely granular, and contained no cellular elements. It stained an even blue with hæmatoxylin. One part of the upper surface of the embolus had become attached to the wall of the vessel against which it rested; another part projected into the lumen of the artery, surrounded by blood. From that part of the arterial wall on which the embolus rested, the endothelium grew into the recesses existing between the upper and lower ends of the plug and the arterial walls, and was continued over the upper surface of the plug in a double or triple layer of cells, covering the embolus, and there protecting it from direct contact with the blood. The passage for the blood alongside the embolus measured at its widest part about one third of the diameter of the artery. It was full of normal blood-corpuscles, which seemed to form a continuous layer with those above and below the embolus. The two outer arterial coats presented no anomaly in the central arteries. Behind the embolus the lumen of the artery was normal.

2. In that part of the lower main branch of the central artery which passed over the papilla, was an embolus, which on section was of the shape of a long quadrangle, whose length was 0.16–0.20 *mm.*, and its width 0.025–0.050 *mm.*

Its relations to the lumen of the artery and to its endothelium

were similar to the one seen in the trunk of the central artery. The proliferation of the small endothelial cells was somewhat more copious than in the former. The muscular layer of the artery was not recognizable at the point of attachment of the embolus, the tunica adventitia was somewhat thickened and infiltrated by cells, and in the media there was found a lumpy product of arteritis.

3. In several small retinal arteries there was a considerable thickening of the wall with contraction of the lumen.

4. There was nothing abnormal in the veins of the optic nerve and retina.

5. In the optic papilla there was no dilatation of the vessels coming from the vascular corona of the sclerotic.

6. Beginning at the chiasm and extending to the bulb the left optic nerve was considerably thinner than the right.

Close behind the bulb the diameter of the left optic nerve was 2.112 *mm.*, that of the right one 2.912 *mm.* At the point of entrance of the central vessels the left measured 2.65 *mm.*, and the right 2.962 *mm.*, while in the optic canal the left nerve had a diameter of 2.35 *mm.*, and the right 3 *mm.* In the part anterior to the posterior layer of the cribriform plate the optic-nerve fibres presented other anomalies, and also various ones in the part lying between the cribriform plate and the chiasm. The optic-nerve fibres were entirely wanting in and anterior to the cribriform plate. From the posterior layer of this plate to the chiasm the bundles of optic nerves were attenuated and presented a grayish appearance. The color of the optic nerve was so changed that a transverse or longitudinal section of the diseased nerve could be distinguished from one of the healthy nerve by the naked eye at the first glance. No bundle of fibres was wanting, but all were so attenuated that a transverse section of the whole nerve seemed rather small even to the naked eye. The connective-tissue sheaths were too large for the bundles of fibres, and the spaces between the surface of the bundles of fibres and the intra-fascicular connective-tissue bands were enlarged, and the latter were bent and displaced. In longitudinal sections we completely missed the fibrillar plexus-like appearance of the normal optic nerve. The fibrillæ had degenerated into numerous small pieces, grains, and granules. There were no fat-granules present.

We find, therefore, that anterior to the posterior surface of the cribriform plate there was complete atrophy from incomplete blood supply, and from the above point to the chiasm there was simple

gray degeneration, which had ended in atrophy in consequence of the stoppage of the functional excitation from the periphery, although the circulation in this part was normal.

7. In the retina there was complete absence of the layers of nerve fibres and ganglion cells. The internal granule-layer was much thinner than normal, and in a large part of the lateral half of the retina it had been reduced to a single or perhaps double layer of granules. The outer granule-layer was normal, as was the layer of rods and cones, as far as could be judged from their defective preservation. The epithelial layer of the retina had, therefore, not suffered from the embolism of the central artery; the layers of nerve matter had disappeared.

If the autopsy had not been permitted, the diagnosis of embolism of the central retinal artery must have been made, judging from the sudden, complete, and lasting loss of sight and the severe degree of ischæmia which accompanied it, but the restoration of circulation could not have been explained. The anatomical examination of this case completely explains how the circulation was reëstablished, but it leaves us to consider the reasons for the sudden emptying of the retinal arteries, just after the embolus lodged, and also why sudden and lasting loss of sight occurred. Why did the retinal arteries collapse, if the passage alongside the embolus in the main trunk was wide enough to normally fill them with blood, and why were the retinal arteries not immediately kept supplied with blood, as was the case eighteen hours later on? For fifteen hours all the papillary vessels were of a rosy color, it is true, but thin like threads. The vessels became larger at the edge of the papilla, but only in the arteries was the column of blood of a uniform color, while in the veins red and light-colored sections alternated. Nine hours later the arteries had reached a normal calibre, and were provided with reflexes; the blood in the veins had acquired a visible movement toward the centre of the papilla. Although no attempt was made by pressure on the eyeball to influence the circulatory conditions, there was no doubt, judging from what was observed in the veins, but that the blood was again circulating in the retinal vessels. It is therefore probable that

only a small quantity of blood could pass the embolus and supply the retinal vessels. The blood flowed slowly under slight pressure through the branches of the central artery, so slowly in fact that the movement of the blood in the veins could not be followed by the naked eye.

In v. Jaeger's remarkable case in which the division of the columns of blood into variously colored small cylinders was first noted, and in which the current had its proper direction, the slowness of the circulation was also shown by the venous hue assumed by the arterial blood[1]; in a case reported by Schneller, in which there was restoration of sight, the arteries for some time had the appearance of thin retinal veins.[2] The sudden diminution of the intravascular pressure immediately after the occurrence of the embolism necessarily caused the subsequent ischæmia. At the moment when the arterial tension was considerably decreased by the lodging of the embolus in the central artery, the natural tendency to contraction of the arteries is more than equal to the pressure of the blood, and, as a result, the arteries contract just as they do after death. Shortly before death the papilla becomes pale, the papillary vessels become attenuated, and immediately after death the arteries and veins (as far as the edge of the papilla) are converted into light-colored narrow bands, which often show a thin red line in their centre, but beyond the papillary margins they are still partially filled with blood. Knapp has already called attention to the great similarity between the ophthalmoscopic appearance of the retina after death and after embolism of the central artery.[3] Embolism may be followed, as has been suggested by v. Recklinghausen,[4] by a spasm of the muscular coat of the arteries. The explanation given above as to the cause of the primary ischæmia of the retina following partial embolism of the central retinal artery, also explains why the papillary portions of the branches of the central artery are

[1] Ueber Staar und Staaroperationen, p. 105.

[2] *L. c.*, p. 275.

[3] Embolism of a branch of the retinal art., etc. These ARCH., vol. i., No. 1, p. 64.

[4] Handbuch der allgemeinen Pathologie des Kreislaufes und der Ernæhrung. Deutsche Chirurgie, 2 und 3 Lief., p. 156.

the thinnest. These parts usually are the broadest and have the thickest walls, and therefore the muscular spasm of the artery should be very marked.

Immediately after the occurrence of a partial embolism in the trunk of the central artery, there are two causes which interrupt the circulation. One is the embolus itself, the other is the contraction of the walls of the arteries. The latter gradually disappears after lasting a few hours, and then the vessels gradually become filled again, soon being of normal calibre, without there having been any change in the character of the embolus itself. In the case mentioned previously, the refilling of the vessels took place between the twelfth and fifteenth hours after the embolus had appeared, and in the case we are just now discussing the retinal arteries had regained their normal diameter and reflex lines within two hours and a quarter after the embolism occurred.

CASE 3.—P. Albert, æt. thirty-two, appeared on October 24, 1882, with the statement that on the morning of that day, at eight o'clock, while quietly walking along the street, he suddenly experienced a considerable disturbance of sight in the right eye, which, in the course of a minute, increased so that he could not distinguish light from dark. After the blindness had continued for one hour and a half, flashes of light began to appear before the eye, and quantitative sensation to light was present. After another hour and a half, when the patient appeared at the clinic, he could distinguish the place and also the shape of the windows. While waiting to be examined vision increased, and at 12 M. we found $V = \frac{6}{6}$. Snellen's test-types were read, but not easily and in their order, because, as the patient said, they only appeared in the " light moments," soon to disappear again. Jaeger No. 3 was easily read at a distance of 10 *cm*. The margins of the visual field were normal, but there was a central scotoma, in which the white leaf became indistinct, light and dark specks alternated with each other, *i. e.*, while the latter cleared up now and again, the formerly light ones became cloudy. This scotoma, whose illumination was not steady for one moment, extended in all directions about 10–15° beyond the centre of the visual field. To the right eye all the samples in Daae's worsted-test seemed fainter, while blue seemed to be a marked gray. Every time the patient

viewed the blue test alternately with the right and left eye, he asserted that the right eye could distinguish no trace of blue, but that every thing seemed to be gray.[1]

With Förster's photometer we found in the left, healthy, eye, D = 1 *mm.;* in the right, D = 3 *mm.* Ophthalmoscopically, only a slight decrease in the transparency of the retina in comparison with the left eye could be made out, but it could not be stated positively that this was pathological. At one o'clock the patient left the clinic. Fifteen minutes later the right eye again became completely blind. At a quarter past three the patient again presented himself. Amaurosis. Tension somewhat above normal. Papilla was pale, and on the surface still had a slight rosy shimmer. The arteries were of normal diameter, and had well-marked reflexes. After the arteries had passed beyond the papilla, their walls became visible as two bright, white lines. The margins of these white lines were not always parallel to the margins of the columns of blood, but in many places the whitish color spread out and sent rays into the neighborhood. In the centre the retinal veins were very imperfectly filled, dark without reflexes, and the parts resting on the papilla were hardly recognizable. Beyond the margin of the papilla the retinal veins became larger, but only seemed to be of nominal size at a distance of about two diameters of the papilla from the edge of the disc. Close by the papilla the veins were very irregularly filled, diminishing in size in places until they were like threads, then becoming wider, and again contracting excessively. This condition was particularly marked in the vein coming from the upper, outer direction, the edge of the blood column in this vein being angular in places. The walls of the veins were not visible. The slightest pressure on the eyeball was followed by diminution in size or complete disappearance of the columns of blood in the arteries. No arterial pulse could be produced. The fovea centralis could be recognized distinctly by

[1] The presence of central scotomata with embolism is often mentioned. In one case Jeaffreson saw the darkening begin in the centre and rapidly spread to the periphery.[1] Ten days after embolism, Schön found a scotoma in the visual field of the affected eye.[2] The scotoma disappeared gradually, but could still be distinguished three weeks after the embolism had occurred, vision having meanwhile increased to counting fingers at twelve feet. Eales mentions a case in which the circulation became normal within a few hours, leaving a prominent central scotoma.[3]

[1] *Brit. Med. Jour.*, Bd. ii., p. 231, 1871. Cit. by Schön : Lehre vom Gesichtsfelde, p. 101.
[2] Lehre vom Gesichtsfelde, etc., p. 94.
[3] Embolism of arteria centralis; reëstablishment of circulation; restoration of vision; permanent central scotoma. *The Ophth. Review*, edited by K. Grossmann & Priestley Smith, vol. i., Jan., 1882. *Centralb. für prakt. Augenheilk.*, 1882, p. 304.

its reflex, and was surrounded by an elliptic reddish-brown zone with indistinct margins ; its horizontal and vertical diameters were respectively $\frac{1}{3}$ and $\frac{1}{4}$ diameters of the papilla ; about this red-brown zone was an indistinctly outlined whitish cloudiness of the retina, on which fine retinal blood-vessels were distinctly visible.

The pulse was very strong—sixty-three per minute ; heart-impulse between the fifth and sixth ribs, heaving and diffusely broadened ; heart-dulness increased principally horizontally. Over all the valves was heard a systolic bruit, of maximum intensity at the apex. Bronchial catarrh. No albumen in the urine.

For one and one half hours the patient was closely watched, and during this time an increase in the retinal cloudiness was observed. Twice the patient inhaled amyl nitrite without any effect on the condition of the fundus.

Oct. 25th, 9 a.m.—All retinal vessels are of normal size in their whole course, and the white bands on either side of the arteries are only visible indistinctly here and there. There is venous pulsation, and on pressure on the globe an arterial pulsation is produced. The papilla is nearly of a normal red color, but its margins are indistinct. The retina about the papilla is clouded a grayish-white. In place of the reflex of the fovea centralis is a light spot, less light, but somewhat larger than the usual reflex. About this spot is a dark-red elliptic zone, and about this the whitish haziness which prevents the reflection of the choroid, but which forms a background on which the fine retinal vessels are seen. The light from the concave mirror is perceived, and its situation is correctly indicated. Occasionally the patient thinks that he can distinguish the outline of a human figure, the reflection from a face, or that he can distinguish the eye of a person.

At 3 P.M. the retinal cloudiness had again become more marked, and had acquired a greenish-white tinge. Fingers are counted at a distance of 30 *cm.;* the patient suddenly catches a glimpse of them as white bands and as suddenly loses them again.

Oct. 26th, 10 a.m.—The ophthalmoscopic appearances are the same, except that the light spot in the fovea has increased in size at the expense of the brownish-red zone. The tension which seemed slightly above normal yesterday now seems to be normal. Fingers are counted at about 40 *cm.*

Oct. 28th.—There is no spontaneous venous pulsation. The light spot in the retina has increased still more, the surrounding brownish-red zone being correspondingly smaller.

Oct. 30th.—The cloudiness about the papilla and macula is decreasing, so that the choroid makes its appearance. The papilla is acquiring a pale appearance. There is no change in the large vessels.

Nov. 1st.—The reddish-brown zone about the fovea centralis has become indistinct, and the light spot can hardly be seen.

Dec. 6, 1882.—The papilla is greenish-white, and reflects light strongly. All papillary vessels are greatly contracted, and along both sides of the columns of blood white bands are seen. Pressure on the eyeball causes an arterial pulse. At the lateral edge of the papilla a well-marked whitish foggy appearance is noted, of crescent shape, projecting beyond the papilla into the retina. Glistening specks are seen on various parts of the fundus near the papilla. Fingers are counted at 50 *cm.*, though only for a short time, as the patient is soon fatigued. Bright light pains the eye.

If case No. 2 prove that a high degree of ischæmia may follow embolism, although the embolus may not completely block the lumen of the vessel, then case 3 proves that sudden, complete, and lasting blindness (the small amount of vision remaining in case No. 3 may be left out of consideration) may follow embolism, notwithstanding the fact that enough of the lumen of the central vessel is patent to prevent a marked ischæmia, or that the latter is of so short a duration that the arteries are of normal diameter two and one quarter hours after the loss of vision. Whenever vision returns in an eye which has lost its power from embolism, we may be sure that the embolus only obstructs a part of the calibre of the vessel; but, on the other hand, it is not advisable to conclude that the whole lumen is occluded, even if vision is permanently lost. There is only one symptom which will decide whether an embolus partially or completely obstructs the flow of blood. The embolism is partial if, soon after it has occurred, there is a fulness of the vessels, or if circulation is present, as is indicated by the movement of blood in the right direction, or by the presence of spontaneous venous pulsation, or by the easily produced arterial pulse, or by the fact that the arteries, which may be emptied by pressure on the eyeball, are rapidly filled, beginning at the papillary centre, on relieving the

pressure on the globe. The presence or absence of vision is of secondary importance in this respect.

The loss of sight in case 3 cannot altogether be referred to sudden decrease in the amount of blood circulating in the retina, which amount, as is shown, could not have been very large, but in the great decrease in the tension of the blood in the retinal vessels, and the consequent decrease in the rapidity of the circulation, which did not provide sufficient nourishment for the retina. At the close of this article we will mention some of the remarkable cases of transient blindness which have so often been described as occurring in cases of embolism, but now we must discuss the probable cause of the sudden blindness, lasting two hours, which in case 3 preceded the permanent loss of sight caused by the embolism. If we are unwilling to assume that there is a cause for this loss of vision entirely distinct from the embolic processes, but which is still in so intimate relation to the latter that it only appears in individuals whose circulatory apparatus gives rise to symptoms of embolism, and even here only in those that at one time or another have embolism of the central artery, then we must also refer this transitory blindness to embolism of the central artery, just as we do the loss of vision which is permanent. It is a matter of regret that this patient was not examined during the period of transitory loss of vision. Mauthner examined a similar case, ophthalmoscopically, during the period of transient blindness, and found the symptoms characteristic of embolism.[1] He gave the most plausible explanation of all that are possible to account for the restoration of vision in his case. We cannot accept the same for our case, because it would compel us to suppose that a second embolus had blocked the calibre of the central artery two hours after the original embolus, which obstructed the origin of the central artery, had become dislodged. We cannot doubt the possibility of such an occurrence, but as we have to depend on inferences, we must prefer the most probable one, *i. e.*, that both losses of vision were caused by *one* embolus, and that the latter after lodging and remaining quies-

[1] *L. c.*, p. 5, des Separat-Abdrucks.

cent for two hours became dislodged by the blood current, and that the new position taken by it was one favorable to the nutrition of the retina, but that three hours later it was again moved and the permanent loss of vision followed. This explanation would be of but little importance if its only claim to credence were its apparent simplicity. We can refer to the support given this view by the peculiar manner in which the sight reappears, and still more so by the condition of vision between the transient and permanent loss of vision. Acuteness of central vision fluctuated greatly between wide margins, rising suddenly, like a tongue of flame to a considerable height, only to fall again until it was apparently extinguished; perception of light was decreased, and the function of the macula, which is most sensitive to insufficiency in the supply of blood, was greatly influenced. This condition of the visual power allows of the assumption of a changeable obstacle to the circulation in the central artery, in fact it seems to us that it can only be explained in this manner, and at the same time it also shows in what manner the function of the retina is influenced by slackening of the circulation. In case 3 this slackening of the circulation was shown ophthalmoscopically by the slight fulness of the veins on the papilla, by the varying breadth of the column of blood in the same vein, by the visibility of the arterial walls outside the papilla, and by the behavior of the papillary portions of the arteries on pressure on the eyeball. In an eye in which the central artery is partly closed by a plug, the intra-ocular pressure—that is, the pressure in the ciliary vascular system, must affect those retinal vessels most, in which the intravascular pressure is the lowest, and these of course are the papillary parts of the veins. It is in this manner that the tapering venous blood-columns, so often seen in such cases, are produced. The same appearances may be produced in the normal eye by pressing on the eyeball. In both cases it is caused by the preponderance of the pressure *on* the vessels, over the blood pressure *in* the vessels. In an eye with embolism, this excess in pressure is caused by the decrease of the pressure in the retinal vessels, and in the normal eye by the excessive pressure exerted *on* the vessels.

In the well-filled arteries, this decrease in the intravascular pressure was shown by the fact that pressure on the surface of the eyeball caused flattening and emptying of the papillary parts, without any arterial pulse appearing. Knapp (*l. c.*) thinks that in case pressure is applied the arterial pulse is only wanting after the vessels have become impervious, and that for this reason we may assume that they are so. We must dispute this assertion. Pressure on the eyeball, followed by success, proves the perviousness of the arteries, but failure to produce the arterial pulse does not show that the arteries are impervious. The arterial pulse cannot appear while the finger obstructs the lumen of the artery. In an eye with normal retinal circulation this occurs only when considerable force is used, while in an eye with a partly plugged central artery, causing decreased blood-pressure in the papillary arteries, it appears on very light pressure on the eyeball. In many cases of embolism of the central artery, followed by restoration of circulation, arterial pulse may be produced by applying the fingers very lightly, and thus avoiding compression of the lumen of the arteries,—Meyerhoefer mentions such a case,[1]—but in others even the lightest pressure causes emptying of the arteries, and the attempt at artificial production of the pulse fails. We will report on several cases of this kind. When, for various reasons, the blood pressure is low in the retinal arteries, the same behavior is noticed on pressure on the eyeball, as is the case in partial embolism of the central artery. Von Graefe noticed that in cholera patients light pressure on the eyeball produced a pulse, while a much greater pressure, which normally would not have sufficed to cause a pulse, produced permanent emptying of the arteries, and that in other cases in which the heart had lost its power in the highest degree, slight pressure emptied the smaller retinal vessels without causing any pulse at all.[2]

The sudden diminution of the intraretinal quantity of blood, together with the decrease of the tension of the

[1] Ueber Embolie der Art. cent., Ret., Inaug.-Dissert., Kœnigsberg, 1873, p. 15.

[2] Ophthalmologische Beobachtungen bei Cholera, *v. Graefe's Archiv*, Bd. xii., 2, pages 208–9.

retinal blood, not only destroys the function of the retinal but is also followed by atrophy of the retinal elements which are nourished by the blood from the central artery. We will first consider the changes produced by partial plugging of the central artery, as they are shown in its visible branches. Why did the retinal vessels waste away with the same rapidity as in cases of ordinary (complete) embolism, although they contained an almost normal quantity of blood soon—namely, in Case 2 twenty-four, in Case 3 two, hours after the entrance of the embolus? One can easily imagine that an ischæmia of high degree, although it may be transient, may totally destroy the function of the retina, but if, later on, the refilled arterial system, which may remain so for several days or weeks, undergoes the highest degree of atrophy, we cannot consider the same as a result of the transient anæmia. As we have already stated, this atrophy of the vascular system of the retina is entirely unreconcilable with the assumption that the refilling of the retinal vessels, which takes place between the time of the primary ischæmia and the final atrophy of the vessels, is caused by vessels connecting the central and ciliary vascular systems. If, after embolism of the central artery, the retina were supplied with blood in this manner, atrophy of the same would certainly not take place. If, on the contrary, the retinal arteries are supplied by that part of the central trunk which is not obstructed, the slight tension of the blood (which is just enough to keep the vessels patent) is not high enough to fill the non-visible capillary arteries with rapidly circulating blood. Their walls are thin, poorly nourished, and atrophy, causing a narrowing of the lumen, and augmenting the already existing obstructions to circulation. The rapidity as well as the intraretinal quantity of blood decrease, and the atrophy progresses gradually from the finest vessels toward the central artery.

The **changes** which take place **in the retinal tissue proper, after embolism** of the central artery, have not up to the present been satisfactorily investigated, as no opportunity had occurred of making an anatomical examination shortly

after the embolus had lodged. We only know that in embolism of the central artery the retina acquires a grayish cloudiness, and that the latter, if the embolism be of short duration, may disappear without leaving a trace in the retina, which again acquires its normal function; but in permanent embolism the cloudiness may increase to total opaqueness of the affected parts, which assume a greenish or bluish-white color, and is also often combined with retinal hemorrhages, and finally complete atrophy of the cerebral layer of the retina takes place. Judging from the behavior of the cloudiness in the region of the macula lutea and the fovea centralis, we may conclude that it is situated in the anterior or cerebral layers of the retina. Death of the part is the result of course of a sudden complete or nearly complete stoppage of circulation, and we will certainly be in complete sympathy with the sense and nomenclature of general pathology, if we designate as necrosis, the group of symptoms, such as cloudiness, swelling and atrophy of the retina, which follow embolism, although the size of the organ affected, and the fact that in many cases the preservation of a slight degree of circulation cause an appearance which is very different from that presented by necrosis of larger, prevalently fibrous organs. Leber declares that the whole retina is not implicated in the necrosis, because the choroidal capillaries also take part in nourishing the retina.[1] This explanation is certainly correct but entirely superfluous, because the central artery nourishes the cerebral retinal layer only, and therefore only this portion will necrose after embolism of that artery. A necrosis of the posterior retinal layers need not be expected; its occurrence, not its absence, would demand an explanation.

Since Cohnheim's investigations in regard to embolism have become known, ophthalmologists have endeavored to make a comparison between the group of clinical symptoms following embolism of the central artery, with that shown by Cohnheim to be typical of a complete occlusion of a terminal artery. If we premise that Cohnheim's view is the correct one, we cannot be surprised to find that hemor-

[1] Graefe and Sæmisch's "Handbuch," Bd. v., 2, p. 547.

rhagic infarction does not appear in those cases of central embolism in which visible normal circulation, repletion of the arteries with bright-red blood, appearance of arterial pulse on slight pressure on the eyeball, or spontaneous venous pulsation are observed. In these cases—and they form the majority of all heretofore described—the *conditio sine qua non* of hemorrhagic infarction, the complete closure of the central artery, as is meant by Cohnheim, is wanting, and the variations, as shown by the ophthalmoscope, from the changes given by Cohnheim, as usual, after complete obstruction of a terminal artery, must be considered as testimony in favor of, rather than against, Cohnheim's views.

Von Recklinghausen states that retinal hemorrhages are more frequent and copious when embolism of an arterial branch takes place than when the main trunk is affected, and explains this by saying that in the first case, the blood from the neighboring unobstructed capillaries rushes into the ischæmic region quite rapidly, causing hemorrhages, while in the latter case, the collateral circulation can only take place through the connecting capillaries of the vascular corona of the sclera, and that the vessels of the ischæmic region are only partially filled. The correctness of this view, advocated by v. Recklinghausen, is not above all doubt. Among thirty-two clinical histories of such cases, which were carefully observed from the beginning, mention is made of the occurrence of hemorrhages in sixteen of them. Of the thirty-two cases, twenty-seven are cases of embolism of the central vessel, and five of some branch of the same: among the twenty-seven cases there was retinal hemorrhage in fourteen; and among the five cases of embolism of a branch, only two cases had hemorrhages. If we include six cases observed by us, all examined shortly after the embolism occurred, we have altogether thirty-one cases of embolism of the central trunk with fifteen cases of hemorrhage, and seven cases of embolism of some lateral branch with three cases of retinal hemorrhage. The percentage of retinal hemorrhage is, therefore, about the same in both categories. In examining the literature of the subject, it is more difficult to

form an opinion as to the intensity of the hemorrhages. The most copious hemorrhage in embolism, so far reported, occurred in the case of embolism of a branch of the central artery, reported by Knapp, which he thinks (*l. c.*) to be a case of hemorrhagic infarction of the retina.

Considering the fact that in one half of the reported cases of embolism of a branch of the central artery, there was no retinal hemorrhage at all, and that in one case of embolism of the central artery, which will be described immediately, there was as copious hemorrhage as in Knapp's case, it seems hardly justifiable, at present, to assume that there is more probability of retinal hemorrhage taking place in embolism of the branches, than of the central artery itself.

Before expressing our opinion as to the causation of these hemorrhages, we will first describe the two cases, from the observation of which we have formed our opinion.

CASE 4.—N—— Franz, aged thirty, became blind in the left eye, twice during the year 1873. On Dec. 8, 1874, there was again a sudden loss of vision of the left eye, this partially disappearing in the course of seven hours, but in the course of the next two hours again appeared, and became permanent. On Dec. 15, 1874, the patient was admitted to Jaeger's clinic. The papilla was pale, the retina cloudy, and from the papilla to the fovea centralis it was entirely opaque, bluish-white, and had a shining appearance. The veins appeared to be normal. On the papilla, and for two or three diameters beyond its border, the blood columns in the arteries were very small, but farther on the arteries were better filled. Both of the large arteries which surrounded the macula, acquired normal fulness by the time they reached the region of the macula, to which they supplied numerous well-filled small branches, which were very distinct on the bright background. Several of these small vessels passed through circular extravasations of blood, or seemed to terminate in them. Other extravasations were seen between the papilla and the macula, and in the latter without apparent connection with vessels. The fovea centralis was represented by a dark spot on a white ground. On the nasal side of the papilla the vessels were filled to a greater degree, no extravasations were present, and the yellowish-red of the choroid was seen through the cloudy retina. Pressure did not produce arterial pulsation. Tension was normal. Amaurosis. Insufficiency of the bicuspid valve. Hypertrophy of the heart.

Dec. 18, 1874.—Filling of the arteries has proceeded towards the margin of the papilla. On slightest pressure on the eyeball, the central sections of the veins become empty, and on increasing the pressure, arterial pulse appears. The number of hemorrhages has increased. In place of the thin extravasations between the papilla and the macula are seen a large number of small, brightly shining specks. The retina is becoming grayish-white, and has lost some of its brightness.

Dec. 21st.—The brightly shining specks have multiplied, the extravasations have increased, the retina has become less transparent, and the arteries are filled to a greater extent. Spontaneous venous pulse is present, and arterial pulse is easily produced.

Dec. 27th.—Only the artery passing downward and outward is abnormally full. On the papilla it contains a thread of blood, and then for the distance of half a papilla-diameter it seems empty, after which it again assumes its normal size. The light specks have increased in number; some of them are bright, others of a dead-white color. They appear only in extravasations of slight depth, and have a distinct parallactic displacement.

Dec. 30th.—The edges of a large extravasation in the region of the macula are surrounded by a bright-white margin.

Jan. 9th, 1875.—Up to the present time new extravasations have been appearing in and about the region of the macula. At the same time the older ones retrograded, and small white spots appeared in them, situated on the surface. Arterial pulse is still easily produced.

Jan. 15th.—There is already a general well-marked contraction of the arterial system.

Feb. 10th.—All extravasations have disappeared. The small white specks still are present. The retinal cloudiness has not entirely disappeared.

July 13th.—The papilla is bright white, flecked with green. Vessels are very narrow, the numerous small vessels in the macula region have disappeared and left no trace. Pressure on the eyeball produces arterial pulsation. The whitish spots are not visible, but in their place the background is somewhat lighter than normal.

CASE 5.—Anna R., aged twenty-five, has been treated by Prof. Loebel, in the General Hospital of Vienna, for insufficiency of the bicuspid valve. At 2 P. M., on July 14, 1875, the patient, who was lying quietly in bed, noticed that things suddenly began to

tremble, after which she became entirely blind in both eyes. After a short time vision was restored in the left eye, while the right remained blind for a quarter of an hour. After this time the loss of vision disappeared in the upper half of the visual field ; in the lower half no further change took place. On July 15th, at 3 P. M., the patient was examined ophthalmoscopically for the first time. The inner-upper part of the papilla was pale, but the whole lower half was of normal color. The papillary margins were indistinct. The main branch of the central artery, which passes upward, was invisible ; its two branches, which are given off near the edge of the papilla, were very small. The remaining vessels were normal. The whole upper half of the retina, down to the papilla, was a greenish white, totally opaque, and separated from the normal, transparent half of the retina by a very sharply defined line. This dividing line nearly corresponds with a horizontal line through the centre of the papilla, rising above the latter in the lateral part, so that the macula lies below it in the comparatively healthy part of the retina.

July 16th.—The upper half of the retina has become of a more intense green, particularly in the lateral parts. The margin of the greenish discoloration is irregular, forming tongue-like projections along the vessels. The lower half of the retina is somewhat clouded. Papilla and vessels same as yesterday. In the upper half of the visual field fingers may be counted at 15′, while the lower half shows no perception to light. The sharply defined line corresponds to the horizontal dividing line of the visual field. Closer examination of the vision is impossible because of the dropsy, etc., of the patient.

July 17th.—Extending in a radial direction and across the lateral margin of the papilla is an extravasation about one half a papilla-diameter in length.

July 18th.—The upper main branch of the central artery is again filled with blood ; its two branches, also, which are somewhat thinner than normal, and their walls are not parallel in all places. On pressing on the eyeball pulsation is seen in the upper artery (up to the present pulsation could only be produced in the lower main branch). On the papilla, above the main arterial branch, is a round white spot. The extravasation which appeared yesterday has grown, a second one has appeared lying alongside a vein, and a third disc-shaped one is seen in the region of the macula. The

latter is considerably larger than the papilla and lies in front of the retinal vessels in the lower nearly normal portion of the retina; its upper edge being separated from the edge of the greenish half of the retina, by a narrow margin of red fundus. A fourth circular extravasation, of about one fifth the diameter of the papilla, lies between the latter and the large extravasation.

July 19th.—On pressure, pulsation in the upper main branch is now as marked as in the lower, while yesterday it was more indistinct. The lower half of the retina has become somewhat more clouded, and in the upper opaque portion new extravasations have appeared, of which one is about one fifth the diameter of the papilla and is traversed by a small vein. The white spot above the upper main branch is bright, lies near the edge of the papilla, anterior to the division of the artery, covering it so that only a small strip of the column of blood is seen at the edge of the vessel. Of the two branches of the upper trunk, that going inwards is normal, while that passing upwards and outwards is very narrow from its commencement, and assumes its normal diameter at a distance of about two and one half diameters of the papilla. At various points the lumen of the contracted part varies, in that comparatively wide portions are placed between contracted parts, and *vice-versa.* Just over the part where this artery becomes normal lies a white spot similar to that over the main trunk. One of the extravasations has become larger.

July 24th.—The visual field has become larger, and vision has become more acute. The retinal cloudiness has decreased, and has begun to lose its sharply defined margins and its shimmer. The small artery passing upward and outward is more evenly filled, but has not yet acquired its normal appearance. The extravasations have become smaller.

July 27th.—The lower half of the retina has become nearly normal; the upper portion is losing more and more of its brightness, opacity, and greenish tinge. The dividing line between the two is disappearing, as is the case also with the extravasations.

July 29th.—The upper main branch of the artery, with its two divisions, have become thinner by one half than the corresponding vessels below, and have lost their reflexes. Arterial pulsation may be easily produced in them. The upper half of the papilla is transparent and nearly white. The light, round spot on the papilla, which covered the nasal half of the main arterial branch, and prevented the blood column from being seen, has now become

distinctly visible. The spot over the artery passing upward and outward is white, sharply defined, much smaller than the one just described, is of irregular shape, and permits the vessel beneath it to be seen through it. There are but slight traces of the extravasation.

On August 3d the patient died.

In both these cases the emboli did not completely block the vessel. The hemorrhages began when normal circulation began to be restored, and increased considerably after the circulation had increased so that an arterial pulse could be produced, and lasted longer in case 4, in which the pulse appeared later than usual. Most of the extravasations were of but slight depth, and were situated superficially. The situation of the large extravasation in case 5 could be estimated from its relations to the retinal vessels; in case 4 the same could be estimated with great probability that they disappeared only after previously forming glittering dots, numerous round, apparently perforating defects and white shining seams, which processes are usually noticed in the large disc-like extravasations between the retina and the vitreous. The principal situation of the hemorrhages was in the region of the macula, where the vessels are particularly delicate, and where, as is well known, hemorrhages very often take place in other diseases of the retina. The hemorrhages therefore occurred as the blood regained its tension—although still below normal,—and passed into the slightly-filled vascular area, either because the vascular walls had become degenerated in consequence of deficient nutrition, as is assumed by Virchow and Cohnheim, or because the smaller vessels had become blocked by coagula, as is assumed by Knapp and v. Recklinghausen. In case 5 the largest extravasation did not lie in the greenish-white part of the retina, but in the part which was comparatively normal.

But it does not follow from this circumstance that the hemorrhages resulted from collateral hyperæmia in the vessels next the one which was obstructed, for they appeared after the latter had again become filled with blood, had pulsated on pressure, and also because the artery passing above the macula (a branch of the plugged vessel) supplied

a large number of small vessels to it, and therefore the extravasation may be referred to the blocked artery, although it lay in the transparent half of the retina.

I had been familiar with the ophthalmoscopic appearances of incomplete embolism long before the anatomical examination of case 2 explained the cause. The sharply defined white spots present so peculiar an appearance in their relation to the retinal vessels, that from the first examination of such a spot (in case 5) I formed the opinion that it was necessarily connected with the embolic process, and in the following case made use of this fact, although I must reject the probability that the white spot represented the ophthalmoscopic appearance of the embolus itself. But as I often noticed the blood circulating in vessels below and alongside the white spot, sometimes behind it also; but never in front of it, leaving no doubt as to the presence of normal circulation, I could not imagine that an incomplete plug could remain for weeks and months in a narrow vessel without increasing by the deposit of coagulated material until circulation was entirely obstructed; and as the white spots appeared like scales or leaflets, the reflex of the vascular walls being wanting where they were present, I came to the conclusion they were circumscribed deposits on or in the vascular walls, caused by the presence of the embolus, in some manner not yet understood.

CASE 6.—L—— Martin, aged twenty-five, came to v. Jaeger's clinic on Aug 1, '75, complaining of disturbance of vision of the left eye. The shape and color of the papilla were normal, as were the distribution, number, and diameter of the papillary and retinal vessels. In the inner-upper quadrant of the papilla, near the entrance of the large vessels, and just anterior to the division of the upper main arterial branch, lies a white, very bright, apparently slightly depressed, sharply outlined, round spot, which in places allows the edges of the blood column to appear indistinctly. Externally, and below the papilla, distant from its edge about one and a half papilla-diameters, is a similar spot, about half as large as the one described, situated on and completely covering an artery. The presence of these spots was in favor of embolism. The causation was also in favor of this view. It was found that

the visual disturbance had appeared suddenly three months previously, while the patient was quietly sitting in his room. It suddenly began to scintillate in front of both eyes; five minutes later vision was again normal in the right eye, but the left one was deficient, and has remained unchanged since. The visual field is deficient, the inner-lower quadrant and the inner half of the lower, lateral quadrant being completely wanting; the remaining part of the visual field is contracted from the periphery. At a distance of 12″ the field is as follows (on a flat surface): Upward 15″, upward and inward 17″, inward 7″, downward and inward 0″, downward 0″, downward and outward 12″, outward 12″, outward and upward 20½″. V = $\frac{26}{20}$, but the letters are not read easily, the patient pausing between the letters to enable him to bring his eye in line again. Only the first words of each line are read; he says he cannot "take in at one time" the long words.

The patient appears to be quite robust, and aside from his eye trouble considers himself quite healthy; has never had palpitation or difficult respiration, but has a well-marked stenosis of the aortic valves. After a diagnosis of embolism of the upper main branch of the central artery had been made, based on the above facts, I showed by ophthalmoscopic examination that it was impossible to produce pulsation in the two superior papillary arteries. While pulsation appeared in the main artery and its branches extending downward, the upper arteries became smaller, and at last entirely empty. Finally it was seen that that part of the retinal artery lying anterior to the white spot was somewhat narrower than the part anterior to it; this affected only a piece about half the length of a diameter of the papilla.

Among the nine cases of embolism which we have examined, there were four in which the ophthalmoscope showed the incompleteness of the emboli. Two of these cases consisted of two emboli each; the whole number of emboli which were seen with the opthalmoscope was therefore six. In case 2, each eye contained an incomplete[1] embolus, visible during life, and a third in the trunk of the left arteria centralis retinæ. These facts alone suffice to show that incomplete emboli in the retinal arteries are not uncommon.

[1] It seems that Leber and Hirschberg also saw incomplete emboli with the ophthalmoscope. Gräfe and Sämisch's "Handbuch der Augenheilkunde," Bd. v., p. 544; and *Centralblatt für prakt. Augenheilk.*, 1884, p. 3.

Further investigations will discover the relative frequency of this variety of embolism; but even at this moment we are justified in saying that its frequency is such, that in explaining the clinical symptoms presented by embolism, it must be taken into consideration.

In closing, we shall discuss the points which our cases present regarding those transient losses of vision which are so often touched on in the literature of embolic diseases of the retina. Among the ninety-four cases published to date, there are nineteen in which mention is made of transient loss of sight; and among eight cases seen by us, there was transitory loss of sight in all but two. We find, therefore, that among 102 cases there are twenty-five in which, besides the loss of sight, due without doubt to the embolus, there were one or more attacks of loss of vision, appearing suddenly and lasting but a short time. If we arrange these remarkable transitory losses of sight according to the extent of retina involved, and to their relation to the loss of sight caused by the embolus, we find they come under the following categories:

1. The transitory loss of sight involves only a part of the visual field of one eye; simultaneously with this, permanent loss of sight affects the remainder of the field from embolism of a branch of the central artery.[1]

2. Transitory loss of vision extends over the whole visual field of one eye:

a. Later on this eye sustains permanent loss of sight from embolism of the central artery,—

α but few hours after transitory loss of vision [2];

β some weeks or months later.[3]

---

[1] Knapp: Embolism of branches of the ret. art. These ARCH., Vol. iii., No. 1, p. 36; 2 cases. Landesberg: *Ibidem*, p. 58, 2 cases. Mauthner: Zur Lehre von der Embolie der Art. cent. Ret., *Wiener med. Jahresberichte*, 1873, Separat-Abdruck, p. 15. Nettleship: Embolism of branch of art. cent. ret., *Lancet*, 1875, 2, p. 491. Swanzy & Fitzgerald: Case of embolism of a branch of central artery of retina, *Dublin Journal of Med.*, 1876, p. 225. Altogether 7 cases.

[2] Liebreich: "Ophthalmoscop. Atlas," p. 15. Von Stellwag: "Abhandlungen aus dem Gebiete der prakt. Augenheilk.," 1882, p. 253. Unsere Fälle 3 und 4. Together, 4 Fälle.

[3] Mauthner: "Lehrbuch der Ophthalmoscop.," p. 342. (This case is the same as the one described in Jäger's "Atlas," p. 113.) Schneller: Fall von Em-

b. The eye of the other side was—

α previously and permanently blind from embolism;[1]

β or became permanently blind by embolism at the moment the other eye was affected with transitory loss of sight.[2]

3. The entire visual field of one eye and a portion of that of the other lose vision temporarily, while the remainder becomes permanently blind from subsequent embolism of a branch of the central artery.[3]

4. The transitory blindness affects both eyes simultaneously; one becomes permanently blind later from embolism of the central trunk.[4]

These transient losses of vision have so much in common with those caused by embolism, that there is great probability that they are caused by an embolus which lasts but a short time. This supposition is further rendered more probable by the fact that in a case of transient blindness Mauthner observed the opthalmoscopic symptoms common to embolism. We can also refer to cases in which an ophthalmoscopic examination, after a return of vision, showed the presence of a small incomplete embolus in one of the retinal arteries of the eye which had temporarily lost its sight. (Right eye in case 2.) It is therefore proved that those losses of sight are of embolic origin, and that they disappear after the embolus is driven out of the main trunk into one of the smaller branches, where it remains without causing much if any mischief.

The last and very important fact is demonstrated by case

---

bolie der Art. cent. Ret. mit Ausgang in Besserung (pp. 14), *Arch. f. Ophthalm.*, Bd. viii., 1, p. 27. v. Wecker: "Traité des maladies du fond de l'œil," etc., 1870, p. 250. Fano: *Annales d'oculist.*, Bd. lii., p. 240 (23 years). Haase: Zur Embolie der Art. cent. Ret.," *Archiv f. Augenheilk.*, Bd. x., p. 474 (½ jahr.). Hirschberg: Zur Embolie der Art. cent. Ret., *Centralblatt fur prakt. Augenheilk.*, 1884, p. 2 (4 Wochen). Knapp: *Archiv f. Ophthalm.*, Bd. xiv., p. 212. Together, 7 Fälle.

[1] Our case 2.

[2] Nettleship: *Nagel's Jahresbericht*, 1874, p. 403.

[3] Barkan: Embolism of a branch of the ret. art. These ARCH., iii., 1, 33. Knapp: *l. c.* Our cases 5 and 6. Together, 4 Fälle.

[4] V. Stellwag: "Abhandlungen aus dem Gebiete der prakt. Augenheilk.," p. 275. Several of the cases recorded in literature might have been classified among one of the above categories. We have, however, mentioned each case but once.

6. In this case both eyes became blind at first, but the only permanent loss of vision was in a part of the left eye. The ophthalmoscope showed an embolus in the artery supplying this part of the retina, but an incomplete embolus was also seen in an artery supplying a part of the retina which still retained its function. It is a well-known fact that complete loss of vision may finally result in loss of sight of a portion of the retina, in case the embolus is driven from the main trunk into one of its branches; but the fact that emboli may get into the lumen of retinal arteries without causing blindness of the corresponding retinal divisions is a new observation, and of much importance in explaining the disappearance of losses of sight caused by emboli.

After having seen that incomplete emboli are not at all uncommon, and after cases 5 and 6 have shown that emboli are detached from their original resting-places in the lumen of the main trunk, divided in several pieces, and lodged in several retinal arteries, and, finally, that incomplete emboli may remain in retinal arteries without marked detriment to the function of the retina, we may then venture to explain the complete disappearance of embolic losses of sight by the entrance of the pieces of the embolus into peripheral retinal arteries of small calibre. But at present we may doubt that incomplete emboli, be they never so small, can remain in retinal vessels without causing some disturbance. We know, however, that they may be present without causing much disturbance. But the assumption that they may be present without causing the slighest disturbance of function is only based on the statements of the patients that, after the disappearance of the blindness, the eye recovered the same degree of vision it had formerly enjoyed. It is quite probable that a close examination of the supposed normal vision would show a contraction of the visual field or a diminution of the perception of light. In case 6 the borders of the retained part of the visual field had moved toward the centre, and it is but right to suppose that this symptom had some connection with the presence of minute emboli in the fine arteries of the anterior portions of the retina.

It is not necessary to imagine that both emboli, which in

two of our cases were in different retinal arteries, belonged to one mass, which was finally divided by the current of blood in the central artery. It is just as probable that they were already divided when they reached the central artery, or that at least they arrived almost simultaneously. By following this assumption further, we may imagine that a sort of embolic dust is washed from the soft growths on the valves by the current of blood, enters one or both carotids, then into the central retinal arteries, resulting in uni- or bilateral blindness, which may entirely or partly disappear as soon as the minute particles have been distributed among the branches of the central artery.

All the transient losses of sight, which are separated from the permanent loss of sight of the same eye caused by embolism, must be referred to separate emboli; but those cases, on the contrary, in which the function of the retina is lost permanently a few hours after the disappearance of the temporary blindness, permit us to assume that an embolus which had lodged in the central artery had become loosened by the blood current, thus restoring the retinal function, which is again lost in a short time. In consideration of this fact, the subdivision 2, a in the classification given should again be divided into two sections. Our case number 3 may be taken as a type of those belonging under 2, *a*, *α*. From the history of this case we see that turning of the embolus may restore, as well as destroy, the function of the eye, and that the mechanical influence on the embolus lying in the lumen of the central artery, which may be expected in many cases from iridectomy or sclerotomy, may cause the destruction of the eye.

NINE SUCCESSIVE CASES IN WHICH THE ELECTRO-MAGNET WAS USED FOR THE REMOVAL OF FRAGMENTS OF IRON FROM THE INTERIOR OF THE EYE.

By H. KNAPP.[1]

A FEW months ago, when I received Hirschberg's interesting monograph on the use of the electro-magnet in ophthalmic surgery, I was astonished to see that he had made as many as thirty-three "magnet-operations." Being under the impression that my personal experience was much less, yet remembering some noteworthy observations, I perused the in-door books of the New York Ophthalmic and Aural Institute, from January, 1882, to June 30th, 1885, and found that the electro-magnet had been used in nine cases during the last 3½ years. The results were as follows: In two cases chips of iron were removed from the iris with the combined aid of magnet, hook, and forceps. Recovery of eye and sight perfect. In the seven remaining cases the fragments of iron were in the vitreous, and though in none of them they could be seen, in four of them they were successfully removed with the magnet, the eyes recovering by first intention without reaction. They all had traumatic cataract from the passage of the foreign body through the lens. In three of them the attempts at extracting the foreign body with the magnet failed, and the eyes were enucleated at once. I shall first describe the two cases of pieces of steel in the iris.

[1] A short abstract of this paper was presented to the Am. Ophthal. Soc., July 15, '85.

CASE 1.—*Piece of steel, twenty-four hours in iris, enveloped by lymphatic exudation. Removal. Recovery.*

Fred. H., æt. twenty-eight, Weehawken. On the morning of April 13, 1882, a small foreign body (steel or iron) entered through the upper-outer quadrant of the cornea, and lodged in the iris, where it could easily be detected. It was embedded in a whitish exudation.

A small corneal incision was made above it with a Graefe's knife. The magnet, then introduced, failed. A hook, inserted and passed with gentle pressure through the white substance, laid the foreign body bare. The magnet, re-introduced, drew the piece of steel into the wound, from which it was scooped out. No iris removed, pupil round.

No irritation. A small anterior synechia formed at the wound. It was broken by eserine, instilled morning and evening, in three days. Patient discharged on fifth day; iris, pupil, and sight normal.

CASE 2.—*Chip of steel,* seventeen years in iris. *Removal. Recovery.*

Thos. D., æt. sixty-five, Waterbury, Ct. Seventeen years ago, while he was knocking the hoop off a sugar-barrel, a piece of the nail-head flew in his right eye. He was laid up for two months on account of severe inflammation of the eye. In a few weeks the other eye became likewise inflamed, but soon recovered. The right eye has had defective sight, but kept free from irritation until a year ago, when it "had a short spell (two or three days) of inflammation." During the four weeks before the patient came to consult me, he had several such attacks. I found a brown foreign body, about the size of a pin-head, sticking in, and projecting over, the inner part of the iris, 1.5 *mm.* from the free edge. The eye not irritated. Some irregular opacities in the crystalline lens. The pupil moved freely, except that part in which the foreign body was lodged. V = $\frac{20}{800}$. F complete. Tn. Though the foreign body, after wounding the cornea, iris, and anterior capsule, had been exceedingly good-natured in keeping quiet so long, I thought it best not to trust it further.

May 30, 1885, the eye being cocainized, I made a small linear section near the margin of the cornea. The electro-magnet, introduced, drew the piece of steel near the wound, where it was seized with forceps, drawn out, and removed with a little piece of iris in

which it was embedded. A very small brown dot was noticed on the edge of the small coloboma, when the iris had resumed its position. It was seized with forceps and likewise removed.

Instilled atropine and cocaine. No reaction. The next day, the anterior chamber restored, the upper edge of the coloboma adhered to the cornea somewhat extensively, the lower to the capsule. Atropine and cocaine. The adhesions broke on the fourth day; pupil wide and free; lens the same. Patient discharged on eighth day, cured. Vision, as before, $\frac{20}{200}$.

The four cases in which fragments of IRON, though not seen, were successfully REMOVED FROM THE VITREOUS, are as follows:

CASE 3.—*Fragment of steel in vitreous. Removed on tenth day. Recovery.*

Thos. Z., æt. forty, of New York. A small piece of steel struck the upper-outer quadrant of the cornea, traversing the iris and lens downward and inward, but cannot be seen in the vitreous, as the lens has become too opaque, though the accident happened only a few hours before the patient came to the dispensary. He was admitted to the hospital at once. There was, during the next nine days, considerable pain and inflammation. F complete. T normal, and at times diminished. All along I advised enucleation, but the patient would not consent.

On the tenth day, when he could see only the movements of the hand, and the inflammation was unabated, I obtained from him the permission to try to extract the foreign body, and, in case of failure, immediately to remove the eye. He was put under ether, and a meridional section of 5‴ in length was made through conjunctiva and sclera in the outer-lower quadrant, posterior to the ciliary region. The wound was held open by squint hooks, a powerful electro-magnet (Hirschberg's) introduced, which, at the third attempt, brought out a piece of steel $2\frac{1}{2}$‴ long, 1‴ wide, $\frac{1}{2}$‴ thick.

The wound was united by conjunctival silk sutures; the eye bandaged.

Some circumorbital pain, œdema of conjunctiva, and slight mucous secretion followed for two days; then healing rapid. Patient was discharged a week after the operation. He showed himself from time to time. There was no irritation from the eye. S $\frac{1}{\infty}$.

F complete. He has not been seen for two years. I fear the eye has shrunken somewhat.

CASE 4.—*Piece of steel in vitreous, successfully removed.*

P. D. S., æt. twenty-two, of New Haven, Conn. A week before patient presented himself, on 2d of May, 1883, he was hammering steel, a chip of which flew into his eye. It could not be seen with the ophthalmoscope, the media being turbid, nor could its point of entrance be seen, but there was a small central opacity in the anterior part of the lens. Pupil wide. Saw only movements of the hand. Eye injected, but free from pain.

For nine days I kept the patient in bed, expecting the vitreous to clear up sufficiently to localize the foreign body. The pupil dilated *ad maximum.* May 11th, eighteen days after the accident, there was slight injection around the cornea, the iris was yellowish, the pupil had a greenish reflex ; at the bottom of the vitreous a yellow patch moved with the eye, and was supposed to enclose the foreign body. T−1. Movements of hand seen only in lower and outer part of visual field.

I made an incision between external and inferior recti, 4‴ long. The electro-magnet brought out, at the first attempt, a piece of steel ⅛″ long, $\frac{1}{16}$″ wide. Eye bandaged. Recovery undisturbed. Tension and aspect of eye became normal, except that a cataract slowly developed.

CASE 5.—*Particle of iron in vitreous, invisible. Removed with magnet. Recovery.*

Mr. B. A. C., of New London, Conn., consulted me, May 4, '84. stating that three days previously, while he was opening a keg of mackerel with a chisel, a piece flew off and struck his left eye, which lost sight at once, and inflamed rapidly. *St. pr.:* No pain ; circumcorneal injection moderate ; a small scar in cornea, a little above its centre ; an opening in ant. lens capsule, behind the corneal scar. Cataract. Fundus not visible. Counts fingers at 1′. F complete ; Tn. No tenderness on pressure.

Operated on the same day. Meridional incision between ext. and inf. recti ; chip, about 1‴ by ½‴, extracted with magnet at the second introduction ; one suture applied.

The day after (*May 5th*) had only slight pain ; pupil perfectly wide ; slight chemosis.

May 6th.—Wound closing slowly, a little vitreous in it.

May 7th.—Improvement continues.

May 9th.—Pupil contracted, an adhesion above and below; atropine every two hours.

May 10th.—Pupil wide and round again.

May 13th.—Injection less, cataract does not progress; wound closed, but yet considerably raised.

May 16th.—Reaction subsiding; swelling of scar diminished.

May 20th.—Eye almost white. V = $\frac{8}{200}$. Discharged, May 22d.

Wrote, June 24, 1885, that, apart from the cataract, the eye was perfectly well, but when I saw him on a visit at his home, July 15, '85, I found the eye slightly shrunken, and a defect in the upper-inner part of the visual field.

In the following case, as in some of the preceding, enucleation had been advised. The patient presented himself in the service of Dr. T. R. Pooley, at the dispensary of the N. Y. Ophthalmic and Aural Institute, and was successfully operated on by him. I was present at the operation and watched the recovery. Dr. Pooley has kindly permitted me to insert a report of the case into this paper.

CASE 6.—*Fragment of steel, invisible in the vitreous, extracted with the electro-magnet. Recovery.*

Feb. 4, 1885.—A. K., æt. thirty-six, of New York, was planing steel, when a splinter flew off and struck his left eye. Little pain followed, but sight was lost. Feb. 5th. *St. pr.* Moderate circumcorneal injection, small pupil, synechiæ. A wound in the inner part of cornea and iris. Lens opaque. S = $\frac{1}{\infty}$. F complete. Some tenderness on pressure over ciliary region.

At 4 P.M. the same day, eye cocainized. Linear incision with a Beer's knife between int. and ext. recti. An electro-magnet brought, on the third introduction, the foreign body into the wound, where it was seized and extracted with some difficulty. It measured 4.5 *mm.* by 1.5 *mm.*, and was crescentic in shape. Conjunctival suture of wound.

Feb. 6th.—Had no pain during the night. No discharge. Slight swelling in region of wound. Suture has given way.

Feb. 8th.—Pupil dilated, adhesion only at point of entrance of foreign body. V = $\frac{1}{200}$.

The recovery was comparativety slow, pupil contracted, and

there was pain every night for a week, then the iritic symptoms subsided, the eye became white and free from pain, the cataract progressed, yet on the day of his discharge from the hospital, eleven days after the operation, he could still count fingers at the distance of 1'. Patient has presented himself at the dispensary from time to time, last on 10th July, when he had a foreign body on his cornea. The operated eye had normal size, aspect, and tension, and was free from irritation.

Though none of these cases, thus far, has given any trouble, yet even when the foreign body is removed the disease may progress; suppuration or, what is worse, chronic irido-cyclitis may develop and threaten the other eye. I therefore make it a rule, before I undertake to remove a foreign body from the interior of the eye, to obtain discretionary power from the patient to remove the eyeball whenever I find it advisable. I resort to enucleation without much hesitation when the wound is in the ciliary region and the extraction of the foreign body offers even moderate difficulty, requiring several introductions of the tip of the magnet and some probing of the interior, in order to find and get hold of the foreign body. The following cases will illustrate this principle.

CASE 7.—*Piece of steel in eye. Extraction with magnet failed. Enucleation.*

Mr. C. N., æt. 47, of Brooklyn; while at work in a machine-shop, Nov., 1883, a chip of steel struck the eye, penetrating the cornea and iris near the upper end of the vertical meridian. Cyclitis rapidly developed. An attempt was made to extract the foreign body with the electro-magnet, but failed, whereupon the eye was at once enucleated. No reaction whatever followed the operation.

CASE 8.—*Unsuccessful attempt to remove a piece of steel from the vitreous. Immediate enucleation.*

The patient was a man, B. v. d. M., æt. 39, of Jersey City. The piece of steel was found upon the ciliary body of the enucleated eye. It was $3'''$–$4'''$ square, and $\frac{1}{2}'''$ thick.

CASE 9.—*Piece of steel in vitreous. Unsuccessful attempt to remove it with magnet. Enucleation.*

G. P., æt. 15, New York. Wound in lower part of ciliary region and margin of cornea. Vitreous cloudy. Marked inflammation. Opening made 4 or 5 *mm*. behind wound, where vitreous appeared most opaque. Electro-magnet introduced, but failed to bring the chip out. Enucleation at once. Eye opened by equatorial section. Foreign body lay in lower part of vitreous just behind pars plana corporis ciliaris.

From most of these cases, as well as from the majority of those reported in literature, we come to the conclusion that foreign bodies in the vitreous are located by preference in the lower part. It seems legitimate, even when the foreign body can neither be seen, nor by an exudation or a limitation in the field of vision be localized with some degree of probability, to open the capsule of the eye in the outer-lower quadrant, introduce the point of a magnet, which should not be too long nor too thin, directly to the bottom of the vitreous, then withdraw. In case the foreign body is not reached, a second or third attempt, cautiously probing a larger area of the interior of the eye, can be made with sufficient safety; but when the foreign body then is not brought out, it is more advisable to enucleate the eye than to make further attempts, because rude dealing with the interior of the eye, even if the foreign body is at last removed, frequently enough causes cyclitis, which is dangerous for both eyes.

A CASE OF EVISCERATION OF THE EYEBALL FOLLOWED BY ORBITAL CELLULITIS (THROMBOSIS). RECOVERY. REMARKS.

By H. KNAPP.

THE substitution of exenteration or evisceration of the globe for enucleation, since its warm recommendation by Alfred Graefe, in the fall of 1883, having become one of the mooted questions of the present day, I beg to contribute the following short communication to its discussion.

For a number of years I have, every now and then, resorted to a more or less complete evacuation of the contents of suppurating or hopelessly injured eyes, until in March, 1883, an evisceration was followed by so severe a reaction that I have not practised it any more. I spoke of the case in the discussion of my paper on *blindness from retinal thrombosis in consequence of facial erysipelas*, at the Am. Ophthalmol. Soc., July 18, 1883, and my remarks are published in the Transactions of the Society, vol. iii., p. 578. As it is particularly important to watch those features or consequences of a new operation that seem to indicate danger, I think the history of such a case ought to have a wider circulation than the easily overlooked note in the Transactions of the Am. Ophthal. Society seems to warrant. The history is as follows:

An actor, St. V., of London, England, came to me at the end of February, 1883, with a staphyloma of the cornea after a recent blennorrhoic ophthalmia. The protrusion disfiguring him so much that he would have had to give up his profession, he wanted

to be operated on. I performed evisceration of the globe in order to give him a better support for an artificial eye than is obtained by enucleation, the cosmetic effect of the operation, in his profession, being particularly important. On March 2d, under ether anæsthesia, I cut off with a Beer's knife and a pair of scissors the anterior segment of the globe, about a line behind the cornea, scraped the contents of the globe clean out with a broad spoon, united, when the bleeding had ceased, the wound with episcleral sutures, strewed a thin layer of iodoform powder in the conjunctival sac, and applied the ordinary bandage of absorbent cotton and a flannel roller. The operation was smooth ; the inner surface of the sclera completely freed from the intra-ocular tissues. Soon afterward the eyeball moderately filled with blood. No pain, no vomiting or other discomfort. Patient passed the night quietly. The next morning his upper lid was swollen, the eyeball tightly filled, some dark blood oozing out between the sutures. Toward evening and during the next night there was great swelling of upper lid and conjunctiva, globe moderately pushed forward, and a thin sanguinolent discharge. Great pain in eye and head. Pulse, 70 ; temperature not markedly increased. The whole had exactly the appearance of panophthalmitis, or rather orbital cellulitis, as there was no suppuration. During the next three days the lids were more swollen, hard, and stiff ; the globe was more prominent, immovable, yet neither large nor hard or painful. The chemosed conjunctiva prevented the closure of the palpebral fissure. The orbital tissue was swollen, rigid, and painful to the touch. There was no suppuration, the discharge being sero-mucous and not abundant. In no place of the orbit was there a sign of softening or fluctuation. The patient for these three days complained of a constant dull headache, had lost his appetite, and was drowsy and apathetic. On the fifth day the sutures were cut ; the wound did not discharge ; it was united. The eye was poulticed for two hours. On the sixth day the patient felt somewhat better. Under continued poulticing for two hours daily the swelling very slowly diminished, also the general symptoms abated only little, until the thirteenth day, when a decided improvement began. From that day his recovery was rapid ; the swelling of lids, conjunctiva, and orbital tissue subsided steadily ; the headache and stupor had disappeared, the eyeball receded and became movable ; and the patient was discharged from the hospital on the nineteenth day. Two weeks later the painless stump carried and moved an artificial eye admirably.

No doubt the final result in this case was excellent, yet it had not been attained without danger to life. Never have I seen such orbital cellulitis, such ominous cerebral symptoms, from any of the numerous enucleations that I have performed in the course of twenty-five years. The picture of the disease was that of *orbital cellulitis from thrombosis*, as we see it, for instance, in the course of facial erysipelas. It terminated in resolution before suppuration had set in; may be that there were, as is not uncommon in such cases, minute abscesses scattered through the cellular tissue of the orbit that did not come to view.

As to the causation of the thrombosis, I venture to give the following explanation. The vortex veins, passing obliquely through the sclerotic, a dense, fibrous tissue of very limited elasticity, will, when divided, not contract as veins in soft tissues, but remain gaping, holding a considerable column of blood, which with its thicker end dips into the liquid contents of the eviscerated globe—in our case, the blood from secondary hemorrhage. The vortex veins in their course through the sclera are, therefore, in a similar condition as the veins of bones, which, according to the researches of Virchow, as all know, are by their patency in a particularly favorable condition for thrombosis and its consequences. Suppose the liquid with which the open vein communicates, is infected, by some cause or other, then the orbital cellulitis will speedily assume a malignant character.

Bearing these conditions and the unusually severe reaction in the above case in mind, I cannot consider evisceration to be a harmless operation until extensive statistics have converted me to the contrary opinion. Alfred Graefe and the host that have copied him say that evisceration is less dangerous than enucleation, because it does "not wound the ways of communication between orbit and cranium, especially the lymph-sheath of the optic nerve, through which the traumatic inflammation is propagated." Every explanation, as well as every operation, has to stand the test of time, and the future has to show whether evisceration is devoid of danger. All oculists that have prac-

tised evisceration to some extent state that, in general, the reaction is more severe and the time of recovery longer than after enucleation. Where there is moderate reaction in many cases, and great reaction in some, as in the one above reported, I think we should be on our guard, lest in some case or other the operation prove fatal. Thus far no lethal issue of evisceration of the globe has come to my knowledge, yet our experience with this operation is still limited, and a word of caution, if there is good reason for it, should never be suppressed. I sincerely hope that evisceration may prove safer than enucleation, or at least as safe, for the mutilation from enucleation is a source of life-long misfortune to many a sufferer in all classes of society.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE SECOND AND THIRD QUARTERS OF THE YEAR 1884.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE CO-OPERATION OF

C. E. Fitzgerald, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

213. Mauthner. Historical remark in regard to the red reflex of the fundus. *Centrabl. f. pract. Augenhk.*, Sept., 1884.

214. Michel. Text-book of ophthalmology. With eighty-five wood-cuts and two colored plates. 674 pp. Wiesbaden, 1884. The author has prepared the book with special regard both for the physician and student. The anatomy of the eye, both normal and pathological, is presented in an excellent manner, as might be presupposed in view of the author's well-known skill in anatomical investigations. The description of diseases is also highly satisfactory. Special attention has been paid to the connection of diseases of the eye with constitutional diseases.

Mauthner (213) quotes from Priestley's history of optics, showing that Mariotte had already experimentally shown that the

redness of the pupil was due to the reflection of light from the fundus.

215. REICH. A few words on the blind in general, and in the Caucasus. Tiflis, 1884.

According to REICH (215) there are in Russia the following institutes for the blind : In St. Petersburg, two of the St. Petersburg Philanthropic Society ; also St. Mary's Institute for blind girls, with an asylum (1871) ; a school for twelve blind boys (1881) ; a school for blind girls, founded 1883. In Warsaw, a school for the blind and the deaf and dumb (1817). In Riga, a school for the blind. A school for eighteen boys projected at Rewal. Asylums for the blind: Two at Moscow, two at St. Petersburg, one at Kiew. A school for the blind in course of erection at Charkow. HIRSCHMANN.

b.—STATISTICAL PAPERS.

216. BROCKMANN, DRAKE. A statistical review of 1,767 cases of cataract-extraction. *Opth. Rev.*, vol. iii., No. 34.

217. DOR. 7e rapport annuel de la clinique ophthalmologique. Lyon, 1884.

218. JUST. 11th report on the Ophthalmic Institute at Zittau for 1882 and 1883. Zittau, 1884.

219. INOUYE. Private ophthalmic clinic at Tokio, Japan. Report for 1883. Tokio, 1884.

220. MAIER. Ninth annual report of the ophthalmic department of the association clinic. Karlsruhe, 1884.

221. SCHIESS-GEMUSEUS. Basel Ophthalmic Institute. 20th annual report, from Jan. 1, 1883, to Jan. 1, 1884. Basel, 1884.

222. SCHÖLER and UHTHOFF. Contributions to the pathology of the optic nerve and retina in constitutional diseases, with statistics of operations during 1882 and 1883 appended. Berlin, 1884.

223. SEGGEL. Report on the ophthalmic department of the military hospital at Munich. Berlin, 1884.

224. WICHERKIEWICZ. 6th annual report on the ophthalmic hospital for the poor at Posen for 1883. Posen, 1884.

DOR (217) treated 1,375 new patients in 1883 ; 23 extractions, with 20 good and 2 moderate results ; 1 failure. In one case a cysticercus was removed from the vitreous. A paper on a new method of operating for trichiasis and entropium is added ; also

a description of the extraction of a cysticereus from the vitreous, and a paper on hemeralopia.

In five cases the cataract was ripened according to Förster's method; in four with good, in one with moderate, result.

JUST (218) treated 6,158 patients. 145 extractions of uncomplicated senile cataracts: 136 good, 4 moderate, results; 5 failures.

INOUYE (219) treated 2,623 patients at Tokio. 13 extractions, 12 of them according to Graefe; 82 iridectomies, 35 operations on the lids, 13 on the conjunctiva, 7 on the muscles, 7 enucleations, 3 sclerotomies, 1 optico-ciliary neurotomy, 4 amputations of the eyeball.

MAIER (220) treated 2,398 eye-patients in 1882, 2,433 in 1883. The largest number of patients was treated in March and April; the smallest, in August and September. Uncomplicated cataracts operated, 85: 77 good, 4 moderate, results; 4 failures—*i. e.*, 4.7 %. Number of more important operations performed, 422.

SCHIESS (221) treated 1,668 new patients at the policlinic, in 1883, and performed 205 operations. Forty-seven extractions of senile cataract: 42 good, 2 moderate, results; 3 failures.

SEGGEL (223) treated 830 soldiers for affections of the eye. Diseases of the conjunctiva were the most numerous, followed by those of the cornea and lids. Trachoma is very rare among the garrison of Munich. Ten cases of gonorrhoic ophthalmia were treated; two eyes were lost. The cause of infection could generally be attributed to some unimportant affection of the eyes, like blepharitis, etc., which induced frequent scratching and rubbing, making infection easier. In 85 % of all cases of iritis, syphilis was the cause. Syphilitic iritis, however, forms only 1 % of all specific diseases.

SCHÖLER (222) performed 731 operations in 1882 and 1883. Among 100 extractions, 3 failures; 26 % obtained $V = \frac{1}{3}-\frac{1}{2}$; 16 % $V = \frac{1}{2}-\frac{2}{3}$; 17 % $V = \frac{2}{3}-1$. 26 % obtained $V = \frac{16}{60}-\frac{16}{200}$. Good V was not expected in 13 patients. Notwithstanding the most stringent antiseptic precautions were observed, septic infection occurred in 2 cases.

WICHERKIEWICZ (224) treated 3,149 patients, and performed 345 operations. Extractions, according to Graefe, 30, with 25 good and 4 moderate results, and 1 failure. Five extractions within the capsule, with 3 good and 2 moderate results. Uletomy, as recommended by Panas—*i. e.*, the division of the sclero-corneal cicatrix in iridectomy for glaucoma, was performed in one case.

Wicherkiewicz recommends instead of this gentle massage of the eyeball during the first days after the iridectomy, in order to prevent too rapid and energetic cicatrization of the wound. Jequirity is not recommended. He praises the galvano-caustic treatment of corneal ulcers and infiltrations.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

225. BAER. Measurement of the visual field and its general diagnostic importance. *Volkmann's Sammlung klinischer Vorträge*, 1884, No. 246.

226. FALCHI. New-formation of the epithelium of the anterior capsule of the lens of fully grown animals in health and in disease. *Arch. f. Ophth.*, vol. xxx., 1.

227. DA GAMA PINTO. On karyokinesis in the inflamed human conjunctiva. *Centralbl. f. pract. Augenhk.*, April, May, 1884.

228. HEYNE. Changes in the tissue of the iris in various eye-diseases. *Inaug.-Diss.*, Königsberg, 1884.

229. TARTUFERI. On karyokinesis of the epithelium of the conjunctiva. *Centralbl. f. pract. Augenhk.*, Aug., 1884.

BAER (225) presents the diagnostic importance of measuring the field of vision in a very instructive manner, and adds a few drawings.

According to FALCHI (226) the new-formation of the epithelial elements of the anterior capsule of the lens takes place in the rat, the hog, the chicken, and the frog by indirect division. This process is more common in amphibia than in mammals and birds. When the anterior capsule is injured, this process of repair is most energetic near the wound, diminishes as the distance from the wound increases, and finally ceases entirely.

PINTO (227) thinks that the proliferation of the inflamed conjunctival epithelium is produced by indirect division of the nuclei. The increased proliferation of the cells is probably the cause of the so-called papillary swelling.

HEYNE (228) has studied the changes in the tissue of the iris, both experimentally and in enucleated diseased eyes, and has obtained the following results.

After the injection of irritating chemical substances into the anterior chamber :

1. Fibrino-purulent exudation into the anterior and posterior

chamber. 2. The exudation lies free upon the surface of the iris; the anterior endothelium and posterior epithelium remain in position. 3. Marked hyperæmia and symptoms of beginning migration in the blood-vessels. 4. Small hemorrhages into the iris. 5. Accumulations of pus corpuscles in the tissue of the iris. 6. Swelling of the cells of the tissue to epithelioid bodies.

In various diseases of the eye the tissue of the iris had undergone the following changes:

In senile cataract:

1. Hypertrophy of the fibrillous tissue in the vascular layer. 2. Beginning of hyaline degeneration in the media of the arteries.

In soft cataract:

Increase of lymph-corpuscles throughout the tissue of the iris.

In synechiæ of the iris:

1. Fibrous degeneration of the tissue of the iris with subsequent compression and obliteration of the arteries; adhesion of the intima; beginning hyaline degeneration. 2. Formation of pigment in the calibre of the blood-vessels. 3. Accumulation of fat in the tissue. 4. Small hemorrhages.

In acute glaucoma:

1. Increase of the lymph-corpuscles in the whole stroma of the iris. 2. Large fissures between the bundles of connective tissue in the vascular layer of the iris (œdema or lymph-stasis). 3. Decrease of the calibre of the arteries.

In chronic glaucoma:

Apparently increased vascularity, due to rarefaction of the iris-tissue. 2. Hyaline or gritty degeneration of the walls of the blood-vessels; the calibre obliterated by endothelial agglutination, often filled up with pigment.

TARTUFERI (229) has experimentally investigated the karyokinetic process, and has obtained the following results: 1. Slight irritation increases it, even after the lapse of only three hours and a half. 2. The greatest increase takes place in the immediate neighborhood of the point of irritation. 3. The most marked increase is produced by bruising. 4. Slight continuous irritation does not exaggerate the effect, while the area over which the process spreads is limited. 5. The intensity of the process diminishes as the distance from the point of irritation increases.

b.—GENERAL THERAPEUTICS.

230. C. ENGELSKJÖN (Christiania). De elektriske stromarters ulige artede terapeutiske virkemaade og den elektro-dynamiske

synsfeltpröve. *Nord. med. Arkiv*, vol. xvi., No. 1, Stockholm, 1884.

231. GRAEFE. Enucleation or exenteration of the globe. Versamml. deutscher Naturforscher u. Aerzte zu Magdeburg, 1884, Tageblatt.

232. JACOBSON. Preparatory iridectomy and antiseptic treatment. *Arch. f. Ophth.*, vol. xxx., 2.

233. NAMIAS. L'antisepsi nella chirurgia oculare. *Riv. clin.*, No. 3, 1884.

According to ENGELSKJÖN (230) the galvanic and faradic currents produce opposite effects, the latter dilating the actively contracted arteries, and the former contracting them when actively dilated. In the fourth chapter he discusses what he calls the electro-diagnostic test of the field of vision. A series of experiments on nervous patients showed that the one kind of current increased the extent of the field of vision, the other diminished it, and that in the case in question the former only was the right one. SCHJÖTZ.

GRAEFE (231) calls attention to the fact that meningitis with fatal result has repeatedly been observed after enucleation of the globe. The meningitis is due to propagation of septic irritation from the wound, and remains limited within the orbit to one or the other communication with the cerebral cavity. Antiseptic treatment has thus far not been able to prevent such accidents with certainty. Graefe therefore proposes to substitute exenteration for enucleation of the globe. This operation, first practised methodically and developed by Graefe, is performed as follows: The conjunctiva is detached about 1–2 *mm.* from the corneal margin, and the cornea is then abscised with the scleral ring. The contents of the globe can then be easily removed with a broad, blunt spoon, leaving nothing but the empty scleral shell. The contents of the globe can be removed enclosed within the uveal tract, so that they can be examined microscopically. After exenteration iodoform is dusted into the shell remaining behind, and the conjunctiva united with a few catgut sutures. The essential difference between enucleation and exenteration consists in this, that in the latter the communications between the orbital and cranial cavities are not injured, thus preventing the propagation of any inflammation along the path. Of course exenteration cannot be practised in tumors of the globe.

According to JACOBSON (232) preparatory iridectomy hastens

the ripening of cataract, makes the extraction easier, and diminishes the danger, inasmuch as the most serious step in the operation is performed first, produces a cleaner, less gaping wound, and prevents inflammation which might be caused by remnants of iris and coagulated blood.

The instruments should be carefully cleansed in absolute alcohol and carbolic acid, disinfecting liquids substituted for water, and prepared cotton for lint and sponges,—measures which in connection with the well-known surgical precautions will prevent an infection of the wound as far as this is possible in view of the peculiar position of the eye. The iodoform dusted in after the operation unites the edges of the wound, prevents the entrance of foreign bodies, and hinders the escape of the aqueous.

According to NAMIAS (233), Manfredi in Modena performs all operations under the strictest antiseptic precautions ; he uses 1–2-per-cent. solutions of carbolic acid only for the spray, the cleansing of the eyes and instruments, and for the bandage. There was one loss from septic infection among his last 132 operations, 55 of which were extractions and 62 iridectomies, and that one loss was an extraction. In this way he succeeded in reducing his losses in extractions from 10.43 per cent. in the pre-antiseptic period to 1.81 per cent. in the last series. He never observed any irritation from the use of carbolic acid, a fact which he ascribes to the manner in which the solutions are prepared. The carbolic acid is heated until it liquefies, a little alcohol is added and this mixture poured into almost boiling distilled water. After thoroughly shaking it and letting it cool off, the solution is filtered and stored away in carefully sealed bottles. This, according to the author, is the secret of preparing 1–2-per-cent. solutions of carbolic acid which do not irritate the eye.

DANTONE.

III.—INSTRUMENTS AND REMEDIES.

a.—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

234. BIRNBACHER. An incandescent lamp for ophthalmoscopic purposes, the patient to lie on his back. *Centralbl. f. pract. Augenhk.*, June.

235. CHARPENTIER. Nouveau modèle d' instrument destiné à l' examen clinique de la sensibilité lumineuse et de la perception des couleurs. *Arch. d' ophth.*, vol. iv., No. 3.

236. CHARPENTIER. Note additionnelle relative à une modification de mon photomètre differentiel. *Arch. d' ophth.*, vol. iv., No. 3.

237. COUPER. A magazine-ophthalmoscope. *Trans. Ophth. Soc.*, vol. iii. Refraction-ophthalmoscope with 72 lenses, which can be brought successively behind the mirror. FITZGERALD.

238. FAUCHER. Blepharostat. *Gaz. des hôp.*, June 21, 1884, No. 72.

239. GAZÉPY. Campimètre portatif. *Rec. d' ophth.*, Aug., 1884.

240. MAKLAKOFF. Un procédé de fixation du globe oculaire pendant les opérations. *Arch. d'ophth.*, vol. iv., No. 5, Sept. and Oct., 1884.

241. SMITH, PRIESTLEY. Simple ophthalmoscope for shadow test. *Ophth. Rev.*, Sept., 1884.

242. SMITH, PRIESTLEY. Ophthalmoscopic lamp. *Ophth. Rev.*, Sept., 1884. Portable lamp in shape of a tube with lenses.

243. ZEHENDER. An apparatus with four mirrors for determining the angle of convergence of the visual lines. *Klin. Monatsbl. f. Augenheilk.*, 1884, vol. xxii., p. 231.

CHARPENTIER'S (235) photometer is intended for clinical purposes, for which it seems well adapted, judging from the description and illustration. Before using it the observer must test himself, his own sensibility being made the standard of comparison; the power of the eye to adapt itself to different intensities of light must, of course, be taken into consideration. For a fuller description *v.* the original. v. MITTELSTÄDT.

In connection with his experiments CHARPENTIER (236) describes an improvement of his differential photometer, whereby he succeeded in illuminating only the background and in excluding light entirely from the black dots (holes in white paper). v. MITTELSTÄDT.

FAUCHER'S (238) speculum is intended to prevent pressure upon the eye when the lids are pressed together; it has a branch above and one below, which can be fixed with a screw in positions varying according to the prominence of the eye, and which rest on the supra- and infra-orbital margins. The speculum is inserted in the usual manner after fixing the branches. v. MITTELSTÄDT.

GAZÉPY (239) has constructed a portable campimeter. It con-

sists mainly of a rule, at one end of which is the object of fixation and in whose sheath there is a disc for the colored objects.

MAKLAKOFF (240) inserts a horn-plate into the conjunctival sac after introducing the speculum; it applies closely to the globe, and fixes or moves the globe by stretching the conjunctival sac, thus preventing the edges of the wound from gaping. He tried the method in an extraction upward, where the patient was unable to roll the eye downward. V. MITTELSTÄDT.

b.—REMEDIES.

244. SCHUCHARDT. Contribution to the history of the use of the schischm (chichm) seeds in eye-diseases, analogous to that of the jequirity-seed. *Correspondenzblätter d. allg. ärztl. Ver. v. Thüringen.*

SCHUCHARDT (244) calls attention to the schischm-seeds, a popular remedy for eye-diseases, which were introduced into Europe from Egypt after Napoleon's campaign in that country. The opinions of oculists of that time differed widely as to its efficacy in trachoma. Some claimed to have obtained excellent results in the army of the Netherlands, while Rust condemned them. The remedy was soon entirely forgotten. It would be interesting to give it another thorough trial.

IV.—ANATOMY.

a.—RETINA AND CHOROID.

245. SCHIEFFERDECKER. Contribution to the knowledge of the supporting tissue of the retina. *Nachrichten v. d. Königl. Gesellsch. d. Wissensch. u. d. Georg-August Univ. zu Göttingen*, 1884, No. 7.

SCHIEFFERDECKER (245) describes two principal systems of larger cells in the supporting tissue of the retina: one which extends through the thickness of the retina, the radial fulcrum-cells; the other parallel to the surface, the tangential fulcrum-cells. The protoplasmic, nuclear portion of both lies in the inner granular layer. The radial fulcrum-cells extend in all animals from the inner to the outer limiting membrane, are more or less fibrous, subdivide into fibrils, and finally interlace to form the outer limiting membrane. The tangential fulcrum-cells can be subdivided into two classes, those which contain nuclei and those which do not; they seem to occur in all vertebrates. The inner granular layer contains the following elements: the nerve-

granules and their fibres; the spongioblasts; the nuclear tangential fulcrum-cells, at least the cell-body and nucleus; the tangential cells without a nucleus; and the nucleus and protoplasmic portion of the cell-body of the radial fulcrum-cells. The outer granular layer contains: the fibres of the inner nerve-granules and their ramifications, which here unite with the fibres of the rods and cones; the terminations of the tangential fulcrum-cells; the outer, generally ramified ends of the radial fulcrum-cells, which pass through perpendicularly or obliquely; and the small granules of the granular layer.

b.—OPTIC NERVE AND BRAIN.

246. GRÜNHAGEN and COHN. The origin of the fibres dilating the pupil. *Centralbl. f. pract. Augenhk.*, June.

247. ULRICH. Refraction and optic disc of the new-born. *Inaug.-Diss.*, Königsberg, 1884.

According to GRÜNHAGEN (246) the sympathetic fibres of the iris which dilate the pupil originate in the brain; there is, therefore, a cilio-cerebral and not a cilio-spinal centre, as some have maintained.

According to ULRICH (247) the papilla of the new-born is remarkable for its gray color, the accumulation of pigment in its neighborhood, and its poverty in small blood-vessels. Otherwise it does not differ from the papilla of adults.

V.—PHYSIOLOGY.

a.—GENERAL PHYSIOLOGY.

248. CHARPENTIER. Nouvelles recherches analytiques sur les fonctions visuelles. *Arch. d'ophth.*, vol. iv., 4.

249. MATTHIESEN. The focal lines of an infinitely thin astigmatic pencil of light after oblique incidence of a homocentric pencil upon a curved surface, and the conoid of rays of Sturm and Kummer. *Arch. f. Ophth.*, vol. xxx., 2.

250. PARINAUD. Sur la sensibilité visuelle. *Comp. rend. des séances de l'acad.*, No. 6.

251. WULFFBERG. On testing the central and peripheric sensibility to light. *Sitzungsber. d. phys.-med. Soc. zu Erlangen*, May 12, 1884.

CHARPENTIER (248) investigated the relation between light- and color-perception, by presenting in succession several red, green,

and blue points of light to the eye, and then determining with a photometer the smallest quantity of light which produced for the various colors first perception of light and then of color. Both tests showed that the smallest quantity of light was necessary for red, and then increased for green and blue, though the amount necessary to produce the sensation of color increased much more rapidly than that necessary to produce the sensation of light. The elements for perceiving light and color, therefore, are not equally sensitive. A similar relation exists when sight is tested.

WULFFBERG (251) describes the essential features of a method for determining rapidly and accurately central and peripheric perception of light, and expressing its anomalies numerically.

b.—RETINA AND BRAIN.

252. EPPLER. The venous pulse of the retina. *Mittheilungen a. d. ophthalm. Klinik in Tübingen*, vol. ii., No, 1. Tübingen, 1884.

253. EWETZKY. An anomaly of the retinal venous pulse hitherto not described. *Wjestnik Ophth.*, May, June, 1884. *Centrabl. f. pract. Augenhk.*, June, 1884.

254. LOEB. The visual disturbances after injury to the gray substance of the brain. From experiments on the dog. *Arch. f. d. ges. Physiol.*, vol. xxxiv., Nos. 1, 2, 3, and 4.

255. MUNK. The central organs of sight and hearing in vertebrates. *Berliner acad. Sitzungsber.*, vol. xxxiv., 1884.

EPPLER (252) recognizes two types of venous pulse: (1) Pulsatory contraction, which is confined to a greater or less extent of the vein; and (2) pulsatory dilatation, the vein becoming broader and darker, while the bright central streak disappears at the dark, wider portion. The dilated part may be the last visible portion of the vein, but may also be adjacent to the latter, so that the terminal portion itself becomes rhythmically paler. Sometimes the dilated part moves rhythmically, rapidly towards the periphery, slowly in a centripetal direction, while the terminal part becomes paler. Both types can occur in the same vein.

EWETZKY (253) observed venous pulsation far beyond the boundaries of the papilla, and well marked in two young ladies, seventeen and eighteen years old. A few weeks later it was visible in only one and much restricted.

LOEB (254) comes to the following conclusions: 1. Every portion of the cortex of the posterior lobe, the medial and lateral

part of Munk's visual sphere, the visual centres of Dalton, Ferrier, Luciani, and Tamburini, can be removed without affecting sight in the slightest degree. These authors are, therefore, mistaken when they assert that the removal of this portion must necessarily be followed by visual disturbances, and especially, that centres of vision are located here. 2. When a visual disturbance occurs in an animal operated upon for the first time after extirpating a portion of the occipital lobe, this disturbance always takes the form of homonymous lateral hemiamblyopia, on the side opposite the injured hemisphere, no matter what portion had been removed. 3. In all cases of unilateral as well as bilateral hemiamblyopia, the animals fix and see best with the macula lutea; the latter, possibly, not being injured, or, at any rate, less than the remaining portions.

The cause of the hemiamblyopia after removal of the so-called visual sphere must be sought in the processes leading to the conception of sight. The whole difference in visual power between the two portions of the field of vision consists in this, that the reaction on all irritation is increased in the neglected part of the visual field. The hemiamblyopia does not depend alone upon the loss of a portion of cortex, but to a very great extent upon the irritation connected with the extirpation and process of healing.

MUNK (255) finds that rabbits whose cerebral hemispheres are removed lose their sight completely. Rabbits live for about fifty hours after the removal, rats and guinea-pigs about ninety. Three stages may be distinguished after the operation. The first, which immediately follows the operation, may be designated as the stage of exhaustion, and lasts about half an hour to an hour. Then follows the stage of rest, which lasts several hours. The third stage is that of unrest, during which the animal runs about more and more. The stage of rest is best suited for testing vision. The pupils react, but otherwise there are no indications that the animals can distinguish between light and darkness.

c.—IRIS AND MUSCLES.

256. LUCHSINGER. The innervation of the iris of the rabbit. *Arch. f. d. ges. Phys.*, vol. xxiv., 5 and 6.

257. QUAGLINO. Riassunto delle attuali nostre cognizioni sui movimenti della pupilla nello stato fisiologico e morboso. *Ann. di ottalm.*, vol. xiii.

258. REYMOND. Modificazione all' esame degli equilibrii muscolari e leggi del rapponto tra l'A. et la convergenza ocularie. *Ann. d'ottalm.*, vol. xiii.

259. SHEGLINSKY. The movements of the pupil. *Dissert.*, Kasan, 1884.

LUCHSINGER (256) has found that when one eye of a rabbit is illuminated while the other is shaded, the sphincter of the iris is much more contracted in the former than in the latter.

SHEGLINSKY'S (259) dissertation was written under Prof. DOGIEL'S supervision. The first two parts contain an historical and a literary review of the anatomy of the muscular apparatus of the iris, and its innervation in mammals and birds. Part third contains the author's own investigations on birds, from which he draws the following conclusions : 1. The nerve-fibres contracting the pupil are contained in birds also in the oculomotor nerve. 2. The cervical part of the sympathetic nerve does not contain any fibres affecting the movements of the pupil. 3. The ophthalmic branch of the fifth nerve contains all the fibres which dilate the pupil ; irritation of its centrifugal fibres (best mechanically within the orbit) always produces dilatation of the pupil ; irritation of the centripetal fibres of the trigeminus (after division) produces contraction of the pupil, a reflex upon the oculomotor nerve. Irritation of both kinds of fibres produces contraction, on account of the mechanical preponderance of the sphincter over the dilator. The author also describes several experiments as to the action of atropine, eserine, curare, and nicotine, and declares himself in favor of the theory generally accepted, that the movements of the pupil are produced by two independent antagonistic muscles. According to a report in *Wjestnik Ophth.*, May and June, 1884. HIRSCHMANN.

d.—COLOR-PERCEPTION.

260. DOBROWOLSKY. On the difference in color-perception when one or several parts of the retina are irritated. *Wjestnik Ophthalm.*, May and June, 1884.

261. DONDERS. Once more the theories of color-perception. *Arch. f. Ophth.*, vol. xxx., 1.

262. KÖNIG. Contribution to the knowledge of dichromatic color-systems. *Arch. f. Ophth.*, vol. xxx., 2. There is no sharp boundary line between red-blind and green-blind, rather the contrary.

263. POSADA-ARMIGO. Dyschromatopsie traumatique. *Rec. d'ophth.*, Aug., 1884.

264. S. M. BURNETT. Theories of color-perception. *Amer. Journ. of Med. Sci.*, July, 1884.

265. VON SZILÁGYÈ. The determination of the intensity of action of the pigment-colors. *Centralbl. f. d. med. Wissensch.*, 1884, No. 17.

According to E. FICK'S (260) investigations (*Pflüger's Arch. f. d. ges. Physiol.*, vol. xvii., p. 152), a bit of partly illuminated colored paper, placed behind a screen in which there is an opening 0.6 *mm.* in diameter, is scarcely recognized in its true color at a distance of 6½ metres, while through 16 openings, though smaller (0.47 *mm.*), 20 *mm.* apart and arranged in a square, the color of the paper behind them could be easily recognized at the stated distance. In the former case the visual angle amounted to 19 sec., in the latter for each opening to 15 sec. From this experiment Fick concludes that the impressions of the 16 openings, though entirely separate, nevertheless seem to be added in producing the sensation of color.

DOBROWOLSKY (260) has lately taken up these experiments again and arrived at the following results: 1. When the openings were 20 *mm.* apart, he could not find so great a difference as Fick, either for colored paper or glasses. 2. In all the experiments the openings were not clearly defined at 3–4 metres distance, though each could be distinctly recognized, but appeared like colored stars, on account of the dispersion-circles. Dobrowolsky here remarks that the refraction of his eyes is normal, and that glasses do not exert any marked influence. 3. The smaller the distance between the openings, the greater the distance at which they still appeared colored to the eye. When only 5 *mm.* apart, the openings seemed to coalesce, *i. e.*, the dispersion-circles touched each other. 4. The same result was reached with 16 squares (½ *cm.*) of red paper pasted on pasteboard. The smaller the distance apart, the sooner the dispersion-circles can touch, and the greater the distance therefore at which they will be recognized as colored. Dobrowolsky does not deny the possibility that separate points of colored light may aid each other in producing the sensation of color, as Fick assumes, but gives a different explanation. As every oculist knows, binocular exceeds monocular vision, sometimes by as much as ¼. This could be demonstrated both in himself and in others who were present at the experiments. From

this Dobrowolsky concludes that in binocular vision the different impressions are combined into one in the brain, and thus add to one another. The same can very probably be assumed for an eye whose retina is irritated at different points.

DONDERS (261) seeks to disprove the objections raised by Hering against his explanations. Color-blindness is an important argument in support of the phylogenetic origin of the sense of color. Our normal color-system developed from a dichromatic system, and first in woman.

POSADA-ARMIGO (263) reports an interesting case of traumatic color-blindness : A colonel was struck by a musket-ball in the left temple. For several days the patient was unconscious and delirious. When consciousness returned it was discovered that he had entirely lost his memory, so that he had to be taught the names of the commonest objects ; he was very deaf, and the sense of taste and smell were lost ; instead of colors he only saw white and black, and could not distinguish "the relief and solid forms of objects." Two months after the injury splinters of bone still came from the wound. Hearing returned on the left (injured) side, but remained very poor on the right ; smell and taste also gradually returned. Soon he could again distinguish "the solid form of bodies," but the dyschromatopsia continued for two years, when he could again distinguish all colors ; he recognized red first, and green last. MARCKWORT.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

BY DR. HORSTMANN.

266. ULRICH, G. Refraction and papilla optica of the eyes of the new-born. *Inaug.-Dissert.*, Königsberg, 1884.

267. HOFFMANN, ARTHUR. The relation of the refraction to the muscles of the eye, based on an examination of the eyes of the scholars of the Strasburg Lyceum. *Inaug.-Diss.*, Strasburg, 1883.

268. BESELIN, OTTO. Examinations on the refraction and base-line of the eyes and the dynamic conditions of the lateral muscles in girls from five to eighteen years old. *Arch. f. Augenhk.*, vol. xiv., 2, p. 132.

269. SEGGEL. On normal vision and the relation between refraction and vision. *Graefe's Arch. f. Ophthalm.*, vol. xxx., 2, p. 69.

ULRICH (266) did not find a single myopic eye among 204 eyes of new-born children, 34 with H 1.0 D, 124 with H 2.0 D, 8 with H 3.0 D, 16 with H 4.0 D, 2 with H 6.0 D, and 20 with regular Ah. He did not find any essential difference between the two eyes of the same child.

That myopia can be produced by near work is well known. It is a disputed question, however, whether the cause should be attributed to the accommodation or to the convergence. In order to cast some light on the etiology of myopia HOFFMANN (267) examined not only the refraction, but also the muscles, of the scholars of the Strasburg Lyceum. He arrived at the following results: The number of myopes was 36.67 %. The abduction of the emmetropes was equal to $8\frac{1}{4}°$ on the average. Abduction more than 13° and less than 10° rarely occurred in normal emmetropic eyes. In the emmetropes there was generally dynamic equilibrium for distant vision; dynamic divergence occurred only together with other abnormities of the eyes.

BESELIN (268) (see the translation of his paper in this number) examined the eyes of the scholars between the ages of five and eighteen, of the female seminary at Heidelberg, as to the dynamic conditions of the lateral muscles of the eye. He found their equilibrium very often disturbed in all refractive conditions, not only in adults, but also in children from five years up. The external recti overbalanced the internal recti in every state of refraction in more than $\frac{1}{3}$ of all cases, in myopia in more than half. The internal recti generally preponderate in hypermetropia, and in about $\frac{1}{3}$ of all cases.

SEGGEL (269) examined 3,120 eyes of soldiers and found in 72 % $V > \frac{20}{20}$ Snellen, in $21\frac{1}{2}$ % V between $\frac{11}{20}$ and $\frac{20}{20}$, in $4\frac{1}{3}$ % between $\frac{6}{20}$ and $\frac{11}{20}$, and in the remainder even less. 1,553 eyes were emmetropic, their $V = \frac{22}{20}$ on the average. (The remainder of the paper appears unreliable; 673 persons are entered with H = 0.25 D., 86 with M = 0.25 D., values that fall altogether within the limits of errors of observation.—H. K.).

VII.—AFFECTIONS OF THE LIDS.

270. BURCHARDT. Contributions to the anatomy of the chalazion. *Centralbl. f. pract. Augenhk.*, 1884, p. 229.

271. v. BRINKEN. Hard chancre on the inner surface of the upper lid. *Zehender's klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 371.

272. ARMAIGNAC, H. Kystes graisseux des deux paupières, d'origine congénitale, en grande partie résorbés probablement spontanément. Extirpation. Guérison. *Rev. clin. d'ocul.*, 1884, No. 4, p. 84.

273. DUJARDIN. Un cas de pustule de la paupière. *Journ. des sciences méd. de Lille*, 1884, No. 11, p. 398.

274. HILBERT, R. On a peculiar form of gangrene of the lids in children. *Vierteljahrsschr. f. Dermatologie u. Syphilis*, 1884, p. 117.

275. BRUCH. Redressement des cils. Trichiasis. *Journ. de méd. et de chir. prat.*, June 1884, p. 257.

276. MARTIN, G. Blepharospasme astigmatique. *Ann. d'ocul.*, vol. xci., p. 231.

BURCHARDT (270) found in many cases of chalazion a movement of granules within the cells belonging to the parenchyma of Meibom's glands. It never occurred in cells which had already undergone fatty degeneration. The cells in which the movement took place resembled the other apparently normal cells. Burchardt thinks that these granules are the cause of the affection of Meibom's glands and lead to the development of a chalazion.

BRINKEN (271) saw an almost circular specific ulcer in a man æt. thirty-two on the inner surface of the upper lid, on the nasal half.

ARMAIGNAC (272) extirpated a congenital fatty tumor of both lids, which extended throughout their whole breadth like a fold to the edge. It formed a loose sac, penetrated the orbicularis muscle with which it was partly united, and extended far into the orbit, without, however, being firmly connected with the neighboring tissue, so that it could easily be removed. Healing by first intention. V. MITTELSTÄDT.

DUJARDIN (273) saw in a child, æt. three, a malignant pustule of the left upper lid with gangrene of $\frac{3}{4}$ of the latter, which developed within 15–16 hours. Compresses of strong solutions of carbolic acid were applied alternately with iodoform salve, whereupon the gangrenous portion was gradually cast off; eighteen days later tarsoraphy was performed, which succeeded completely.

V. MITTELSTÄDT.

HILBERT (274) reports two cases of gangrene of the lids in otherwise healthy children. The gangrenous portions were removed, the floor of the defect touched repeatedly with lunar caustic, and a bandage of carbolized cotton applied. About a week later the defect was completely healed over.

BRUCH (275) destroys the follicles with a heated lead-pencil-point in circumscript trichiasis. In other cases he performs the illaqueatio of Celsus, which does not seem to have been known to him as such. v. MITTELSTÄDT.

MARTIN (276) reports 5 cases of blepharospasm, which he ascribes to astigmatism. MARCKWORT.

VIII.—LACHRYMAL APPARATUS.

277. DEL TORO. Acute dacryocystitis produced by jequirity. *Cronica de especialidades medico-quirurgicas*, Jan., 1884.

DEL TORO (277) reports the cases of two girls of eight and nineteen respectively, who never before had suffered from any lachrymal affection, in whom acute dacryocystitis developed after the application of jequirity.

IX.—MUSCLES AND NERVES.

278. BERRY, G. A. The determination of the degree of latent and manifest squint in metre-angles. Suggestion. *Ophthalmic Rev.*, vol. iii., No. 33, p. 193.

279. REVOLET. De l'insuffisance des droits internes et de son traitement par la ténotomie partielle. *Thèse de Paris*, 1884.

280. FERGUSON, M. A. Spasmodic internal strabismus. *Med. Rec.*, June 7, 1884, p. 638.

281. BRAILEY, W. Muscular asthenopia. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., p. 207.

282. MADDOX. Relation between convergence and accommodation. *Ibid.*, p. 280.

283. MAUTHNER, L. The etiology of the complicated paralyses of the muscles of the eye. *Wiener med. Blätter*, 1884, No. 20, p. 619.

284. HOCK. Case of paralysis of all the muscles of both eyes. *Wiener med. Blätt.*, 1884, No. 22, p. 681.

285. LAGRANGE. L'arrachement du nerf nasal externe dans les douleurs ciliaires et la nevralgie du trijumeau. *Arch. d'ophth.*, 1884, vol. iv., 4, p. 324.

REVOLAT (279) recommends partial tenotomy of the external recti, according to Abadie, in insufficieny of the internal recti. The entire attachment of the muscle is severed, except a small central portion ; the detached portions of the tendon are then seized with a forceps and abscised obliquely with a pair of scissors, so as to weaken the power of the muscle. v. MITTELSTÄDT.

FERGUSON'S (280) case was one of a watchmaker who in the course of his work developed an inward squint of the left eye which was at first periodic. This eye was myopic. No account of his eye under a mydriatic is given. He is reputed to have improved under a plane glass for the right and a concave (number not given) for the left, and some general treatment. BURNETT.

BRAILEY (281) reports the case of a child aged seven years, who suffered from severe headaches after very short use of his eyes. No hypermetropia ; complete and lasting relief afforded by prisms with bases inwards. FITZGERALD.

MADDOX (282) devised an ingenious instrument for determining the relation between convergence and accommodation.

FITZGERALD.

MAUTHNER (283) subdivides the paralyses of the muscles of the eye into peripheric, orbital, and intracranial, the latter again into basal and cerebral. The basal paralyses may be the result of meningitis, neoplasms, etc. The cerebral paralyses he subdivides into cortical, nuclear, and fascicular. In the nuclear the ciliary muscle and sphincter are not affected ; cerebral symptoms are absent ; they exist since birth or develop, generally in young persons, in course of a few years. Besides these cases others occur which gradually develop under the symptoms of bulbar paralysis and ataxia ; the symptoms of the former affection subside, while the paralysis of the ocular muscles remains.

HOCK (284) observed paralysis of all the muscles of the eye, except the sphincter of the iris and the ciliary muscle, in a patient aged forty, who had had necrosis of the lower jaw at the age of fourteen. Hock attributes the cause to a basilar affection, and does not consider it a muscular paralysis.

X.—ORBIT AND NEIGHBORING CAVITIES.

285*a*. PUÉCHAGUT. De la ténonite ou inflâmmation de la bourse cellulaire retro-oculaire d'origine rhumatismale. *Thèse de Paris*, 1884.

286. HOCK. Case of tenonitis. *Allg. Wiener med. Ztg.*, 1884, No. 26.

287. VOSSIUS, A. Case of orbital phlegmone in thrombo-phlebitis of the orbital vein after extraction of a carious molar tooth, ending in recovery, with preservation of sight as well as of the globe. *Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 157.

288. FOX, L. WEBSTER. Serous cystic tumors of the orbit, *Med. News*, vol. xliv., No. 26, p. 749.

289. STORY, J. R. Rare tumor of orbit. *Ophth. Rev.*, vol. iii., No. 34, p. 245.

290. BADAL. Exostose éburnée du frontal. *Ann. d'ocul.*, 1884, vol. xcii., p. 20.

291. JAN HOENE. Notes of ophthalmological cases. *Gazeta Lekarska*, 1884, No. 17. Exophthalmus due to a gumma. Recovery after inunction.

292. EWETZKY. Case of ectasia of the labyrinth of the ethmoid bone. *Wjestnik ophthalmologie*, May and June, 1884.

293. BOUCHER. Anthrax de la lèvre supérieure ; phlébite faciale double. Phlegmon suppuré des deux orbites ; accidents cérébraux ; nécrose partielle des deux cotés. *Rec. a'ophth.*, May, 1884, p. 270.

294. HEDINGER. Traitement de la maladie de Basedow par les courants galvaniques. *Paris méd. et Quinzaine méd.*, Mar. 6, 1884, p. 568.

295. RUSSEL, J. A case of Graves' disease. *Ophth. Rev.*, vol. iii., No. 32, p. 174.

296. BULLER, F. Mucocele of the frontal sinus. *Am. Jour. of Ophth.*, May, 1884.

297. BETTMAN, B. Pulsating exophthalmus. *Jour. Am. Med. Assoc.*, Jan. 26, 1884.

298. POLLAK. Melano-sarcoma of the orbit. *St. Louis Med. and Surg. Jour.*, Feb., 1884.

HOCK (286) describes a case of tenonitis in a feeble man. He found an inflammatory swelling of the conjunctiva, protrusion of the globes, checked mobility, but good vision. A light pressure bandage was applied, and the patient made to perspire freely, whereupon he recovered completely.

VOSSIUS (287) observed an orbital phlegmone, which rapidly developed after the extraction of a carious tooth, and was preceded by violent toothache lasting a day. There was marked protrusion of the eyeball, checked mobility, and dilatation of the pupil, which was followed by an abscess of the lid, periostitis of the lamina papyracea of the ethmoid bone, and discharge of pus from the nostril of the same side. The globe was preserved, and sight, the impairment of which was due to inflammation of the

optic nerve with thrombo-phlebitis of the lower outer vein, became normal again as the changes in the fundus disappeared. During the inflammation the state of refraction increased, but diminished again when the protrusion of the globe disappeared. The affection lasted six weeks.

Fox (288) reports four cases of cystic tumors of the orbit. The treatment consisted in making an incision into the cyst, evacuating the contents, and applying a point of nitrate of silver thoroughly to the walls. It was successful in all the cases.

BURNETT.

STORY (289) removed a tumor from the orbit of a young girl, which was situated near the margin of the left lower lid towards the nasal side, was inclosed in a capsule, and was bony hard. It consisted of a series of different layers of apparently fibrous tissue and calcified matter of uncertain nature. FITZGERALD.

BADAL (290) reports the successful removal of a large osteoma of the orbit. No relapse had occurred a year later.

MARCKWORT.

EWETZKY (292) reports the following case: The patient was a farmer's wife, twenty-seven years old, whose right eye was pushed outward considerably and slightly downwards by a hemispherical, smooth, painless, fluctuating tumor situated principally above the ligam. palp. intern. and covered with normal conjunctiva and skin. Tear-ducts normal. $V=\frac{15}{30}$. The ophthalmoscope revealed moderate œdema of the papilla and venous retinal hyperæmia. Nasal cavity free. Dr. Logetschnikow, who performed the operation, succeeded in removing only a part of the free wall united to the periosteum of the orbit, and the viscid contents, as the walls of the cavity were connected with the portio orbit. oss. frontis, the lamina perpendic. oss. ethmoidalis, and the pars. orbit. max. sup. The lamina papyr. orbit. was entirely wanting. A drainage-tube was inserted into the cavity, while the walls were washed with antiseptic solutions and cauterized with nitrate of silver. Connection with the nasal cavity was soon established, which persisted after the patient had been discharged. The opening at the inner canthus had also not yet closed. The author declares the case to be one of ectasia of the labyrinth of the ethmoid bone, a conclusion which he bases upon a macro- and micro-scopic examination of an excised piece and of the contents. This would be the fourth case described (1. HULKE, 1864; 2. SCHUH, 1868; 3. KNAPP, 1876). HIRSCHMANN.

BOUCHER (293) reports a case, very interesting on account of its favorable termination, of anthrax of the upper lip, with subsequent phlebitis of the facial vein of both sides, purulent phlegmone of the orbital cavities, and attendant cerebral symptoms. In Nov., 1881, a furuncle of one ala nasi, and then an anthrax of the upper lip, developed in an otherwise healthy French soldier stationed in Tunis. When the patient came into Boucher's care, his face was very œdematous and red, the facial veins converted into hard cords, the lids very much swollen, the lower ones ectropionized; chemosis of the conjunctiva, and exophthalmus of both eyes; the patient almost somnolent, temp. 40.6°. Subsequently an abscess developed at the bridge of the nose, two abscesses in the right upper lid, one in the left upper lid, and one in the left cheek, which, like the anthrax of the lip and the furuncle of the nose, were incised at an early date. From the bridge of the nose a probe could be passed 2 *cm.* deep into the right orbit, and from the point of incision in the left upper lid a bent probe could be pushed behind the left eyeball to the optic nerve. The facial veins, as well as the edges of the abscesses, were treated energetically with Paquelin's thermocautery. The eyeballs being imperfectly covered, an ulcer developed in both in the lower half of the cornea, which soon perforated. Nevertheless, his general condition gradually improved, so that the patient not only remained alive, but had on Jan. 4th in the right eye $V=\frac{1}{8}$, in the left $\frac{1}{4}$. Boucher being called away, transferred the patient on Jan. 7th to another physician, and heard later that on Jan. 11th double glaucoma developed, and that he was discharged on March 13th in the following condition: anterior staphyloma of both eyes, greater in left than in right; incarceration of iris in both. Diffuse opacities of the corneæ. V much reduced, especially in left eye.

MARCKWORT.

HEDINGER (294) observed a very severe case of Graves' disease. Marked improvement on galvanization of the sympathetic nerve,—anode on the gangl. suprem., kathode on retromaxillary fossa; two applications daily of 10 minutes each, with 4–8 elements. V. MITTELSTÄDT.

RUSSELL (295) describes a case of Graves' disease in a feeble girl of sixteen. In the beginning there was proptosis on both sides, which after four months subsided on the right, while the left eye remained bulging. There was a small struma; the dull percussion sound over the heart exceeded the normal limits;

there was a presystolic murmur over the mitral valve, and a systolic murmur in the region of the pulmonary artery.

BULLER (296) describes a mucocele of the orbit, which caused protrusion of the left eye, and had destroyed the inner wall of the orbit. A trocar was plunged in, giving exit to thick, viscid mucus. A drainage-tube was then introduced, and the patient gradually improved, though still under observation when the case was reported. BURNETT.

BETTMAN (297) relates a case of arterio-venous aneurism, caused by a fracture at the base of the skull. There was papillitis of both sides. Marked exophthalmus in both eyes; more in left. A ligation of the common carotid was made with relief to symptoms, but twelve and a half days after the operation the circulation was suddenly re-established, producing a return of all the unpleasant symptoms. BURNETT.

POLLAK (298) exhibited a man whose entire orbit was filled with a growth of sarcomatous nature. Ten years ago he removed the eye on account of glio-sarcoma of the retina and choroid, and six years later a small relapse filling about one fifth of the orbit. There are also a few nodules in the right hypochondrium, making it probable that the viscera have been attacked. BURNETT.

XI.—CONJUNCTIVA, CORNEA, SCLERA.

299. BEUMER and PEIPER. On blennorrhœa neonatorum. *Arch. f. Gynækol.*, vol. xxiii., p. 479.

300. KÖNIGSTEIN. The present status of our knowledge of the blennorrhœa of the new-born. *Wiener med. Presse*, 1884, Nos. 31, 32, 33, 35.

301. LEOPOLD and WESSEL. Contribution to the etiology and prophylaxis of blennorrhœa neonatorum. *Arch. f. Gynækol.*, vol. xxiv., p. 92.

302. CREDÉ. The prevention of blennorrhœa neonatorum, the most frequent and most important cause of blindness. Berlin, 1884. Hirschwald.

303. HALTENHOFF, G. On gonorrhoic conjunctivitis without inoculation. *Arch. f. Augenhk.*, vol. xiv., p. 103.

304. MAGNI, G. Di una nuova forma di conjonctivite scrofolosa. *Riv. clin.*, No. 5, May, 1884.

305. STEFFAN, PH. The relation of pemphigus of the conjunctiva to the so-called essential xerosis of the conjunctiva.

(Graefe's syndesmitis degenerativa). *Zehender's klin. Monatsbl. f. Augenhk.*, vol. xxii, p. 271.

306. SCHÖLER. Demonstration of a case of essential xerosis of the conjunctiva. *Berliner klin. Wochenschr.*, 1884, No. 33.

307. DEHENNE, O. Du traitement des granulations conjonctivales par le thermo-cautère. *Rev. d'ocul.*, 1884, No. 6, p. 137.

308. WARLOMONT. Collyres contre le pannus. *Union méd.* 1884, No. 51, p. 619.

309. VOUCKCHEWITSCH. Étude sur le traitement de l'ophthalmie granuleuse. *Rec. d'ophth.*, April and Aug.

310. JACOBSON. Contribution to the knowledge of conjunctivitis granulosa. *Deutsche med. Ztg.*, 1884, No. 41, p. 568.

311. SCHENKL. On thirty cases of trachoma treated with jequirity. *Prager med. Wochenschr.*, 1884, No. 29.

312. HEISRATH. On jequirity. *Berl. klin. Wochenschr.*, 1884, No. 37.

313. WIDMARK, J. Om jequirity-oftalmien. *Nord. med. Arkiv.*, vol. xvi., No. 5. Stockholm, 1884.

314. NYS. Traitement du trachome et des différentes affections cornéennes par les lotions du jequirity. *Rev. d'ocul.*, 1884, No. 6, p. 435.

315. HARDY. Ferment soluble de jequirity. *Gaz. hebd.*, 1884, No. 13, p. 211.

316. DENEFFE. Le jequirity et le jequiritisme dans le traitement du trachome. *Bull. de l'acad. royale de Belgique*, 1884, No. 3, p. 301.

317. BRUNSCHWIG. Considérations sur le jequirity. Son action physiologique. Ses effets thérapeutiques dans le traitement de la conjonctivite granuleuse. *Thèse de Nancy*, 1884.

318. FERNANDEZ, SANTOS. Analisis sobre el tratamiento de los granulos con el jequirity par el Dr. A. de la Peña. *La oftalm. prat.*, anno iii., No. 24, p. 29.

319. PENA, A. DE LA. Tratamiento de los granulos con el jequirity. *Revista de cienc. méd.*, June, 1884.

320. LANDESBERG, M. Warning to the medical practitioners in regard to the use of jequirity. *Phila. County Med. Soc.*, 1884.

321. SEVERI. Del jequirity in rapporto alla tossilogia e alla medicina legale. *Lo Sperimentale*, No. 1, 1884.

322. POLLAK, S. The therapeutic value of jequirity. *Am. Jour. of Ophth.*, June, 1884.

323. ANDREWS, J. A. Trachoma and the etiology of jequirity ophthalmia. *Arch. of Med.*, June, 1884.

324. MOYNE, G. Cistico della congiuntiva. *Boll. d'ocul.*, vol. vi., No. 8, p. 178.

325. LAGRANGE. Du sarcome mélanique de la conjonctive. *Arch. d'ophth.*, vol. iv., No. 4, p. 336.

326. MINOR. Case of gumma of the conjunctiva. *Arch. f. Augenheilk.*, vol. xiv., 2, p. 174.

327. HIRSCHBERGER and BIRNBACHER. Case of condylomatous papilloma of the conjunctiva. *Centralbl. f. prakt. Augenhk.*, 1884, p. 200.

328. BERGMEISTER. Case of congenital dermoid tumor of both eyes. *Wiener med. Blätter*, 1884, No. 24, p. 748.

329. LABAT, A. Eruption de horse-pox sur la conjonctive d'un poulain. *Rev. sanitaire de Bordeaux*, 1884, No. 6.

330. KUSCHBERT. Xerosis of the conjunctiva and the symptoms attending it. *Deutsche med. Wochenschr.*, 1884, Nos. 21 and 22.

331. DENK, O. Contributions to the mycotic affections of the eye. *Inaug.-Diss.*, Munich, 1884.

In his monograph on the prevention of blennorrhœa neonatorum, CREDÉ (302) recommends putting the children into the bath immediately after ligating the umbilical cord, carefully cleansing the eyes with a linen rag, or, better still, prepared cotton, and then instilling a 2-per-cent. solution of nitrate of silver with a glass rod. The female genital organs are washed only for the sake of cleanliness, though this is scarcely necessary, as they are of no consequence for the prevention of infection.

According to BEUMER and PEIPER (299) 9–22.4 per cent. of all the new-born were affected with blennorrhœa at the Greifswald gynæcological clinic from 1870 to 1880; since the introduction of Crede's method in 1881–1882, only 1.7–1.9 per cent.

LEOPOLD and WESSEL (301) observed only seven cases of blennorrhœa among 1,002 new-born children within the first ten days at the lying-in asylum at Dresden after the introduction of CREDE's method.

KÖNIGSTEIN (300) also recommends Crede's method. When it fails in preventing the disease he brushes a 2-per-cent. solution

of nitrate of silver over the conjunctiva in the stage of swelling, and a 4–5-per-cent. solution in the stage of secretion.

MAGNI (304) has discovered a new form of conjunctivitis. After an acute conjunctival catarrh a large number of minute nodules developed in the quadrant between the insertions of the superior and external recti muscles, which gradually grew to the size of a milium and then disappeared again in the course of a few weeks without leaving any trace. Under the microscope the exudation was found to be a conglomeration of epithelial cells in follicular arrangement. [Primary (infiltration) stage of crescentic ulcer.—ED.]

STEFFAN (305) describes a case of essential xerosis of the conjunctiva, in which pemphigus pustules developed afterwards upon the lids. He thinks that the affection was caused by a pemphigus eruption on the conjunctiva.

SCHÖLER (306) also observed essential xerosis of the conjunctiva in an older woman. Pemphigus could be excluded ; the cause must be sought in destruction of the subconjunctival tissue.

DEHENNE (307) has used the galvano-cautery in trachoma for three months with good results. He touches only the conjunctiva, when it alone is affected, and performs pericorneal cauterizations every five or six days in pannus. V. MITTELSTÄDT.

WARLOMONT (308) recommends 2–3 instillations daily of sulphate of copper in glycerine in concentration of 1:8, 1:6, and 1:4 according to the reaction of the eye. In dense pannus and prolific granulations he also spreads a thin layer of finely divided sulphate of copper upon the conjunctiva and cornea.

V. MITTELSTÄDT.

VOUCKCHEWITSCH (309) discusses granular conjunctivitis at length with special regard to the history of the treatment of this disease. He recommends excision of the fornix, and cites the clinical history of seventeen cases in support.

MARCKWORT.

JACOBSON (310) warns against the use of jequirity, as it endangers the cornea, and describes such a case.

SCHENKL (311) treated thirty cases of trachoma with jequirity. The results, however, were so unsatisfactory that the trials were discontinued, there being no doubt that jequirity was inferior to sulphate of copper. HEISRATH (312) came to similar conclusions.

WIDMARK (313) draws the following conclusions from his ex-

periments on rabbits: 1. The jequirity infusion, introduced into the system of animals, acts as a poison. 2. Applied locally to mucous membranes (conjunctiva, intestines), it produces a violent catarrh. 3. The infusion is well adapted for the development of various kinds of microbes, with the increase of which the efficiency of the infusion decreases. 4. These microbes generally cannot live in the system; they are not found in the conjunctiva or in the conjunctival secretion after the introduction of the infusion into the conjunctival sac, neither are they found in the local abscesses or in the blood after subcutaneous injections. The animal does not die under the symptoms of infection, neither do the pathologico-anatomical changes indicate this. 5. In other words, the action of jequirity is not due to a bacillus. In view of the results of some therapeutical experiments the author expresses the opinion that jequirity only occasionally has a beneficial influence on trachoma, but that it sometimes clears up the cornea. SCHJÖTZ.

NYS (314) recommends jequirity in atonic ulcers and facets of the cornea, and in obstinate cases of phlyctenular kerato-conjunctivitis. He saw complete recovery from an intense parenchymatous keratitis after the application of a three-per-cent. infusion, after every other kind of treatment had failed. v. MITTELSTÄDT.

According to HARDY (315) the so-called alkaloid of jequirity is a soluble ferment, which is converted into peptone by sulphuric acid, and loses its power when heated to 100°.

v. MITTELSTÄDT.

DENEFFE (316) did not obtain any results with jequirity in old cases of trachoma; fresh cases were cured, but ulcers developed upon the previously intact cornea. The results with jequiritine, however, were better. v. MITTELSTÄDT.

BRUNSCHWIG'S (317) experiments show that the active principle of jequirity is a soluble ferment, analogous to pepsine; the development of bacteria is only secondary. Its action is that of a local irritant, and dependent in intensity more upon the individual irritability of the conjunctiva than the concentration of the solution. He frequently saw genuine trachoma cured, while the remedy failed in conjunctivitis combined with the development of follicles and papillæ. v. MITTELSTÄDT.

According to PEÑA (318 and 319) jequirity generally cures trachoma completely and permanently; it is the specific remedy for the disease; it is more effective in torpid, chronic conditions with slight discharge than in acute cases. Jequirity also cures other

ocular affections—for instance, pannus, pustular keratitis, etc.; it is a remedy which, when prepared in the customary way, does not endanger the eye. The maceration must always be used cold, as heat destroys its therapeutic action. Thus far no substitute for jequirity has been found.

LANDESBERG (320) warns against the use of jequirity, as it endangers the cornea.

The investigations of SEVERI (321) of the general action of jequirity show that one cubic *cm.* of a five-per-cent. infusion, injected subcutaneously, kills warm-blooded animals, like rabbits, pigeons, and mice, in 18–48 hours; frogs, however, only after 8–14 days. Much larger quantities can be borne when introduced into the stomach. The temperature is greatly reduced, the animal loses rapidly in flesh, and albuminuria ensues, but death does not always follow. The author thinks that the active principle of jequirity is of a chemical nature. DANTONE.

POLLAK (322) treated fifty-one cases of trachoma with jequirity; in one the cornea sloughed. He uses a three-per-cent. solution. BURNETT.

ANDREWS (323) looks upon trachoma as a simple blennorrhœa, produced by bad hygiene, and not by micrococci. He treated fifty-seven cases with jequirity, three without result, while in one extensive ulceration of the cornea developed. He thinks the active principle is a vegetable substance. BURNETT.

MOYNE (324) has seen five cysts of the conjunctiva in twenty-six years of ophthalmic practice; three were situated in the fornix, two on the ocular conjunctiva. In every case they were congenital. DANTONE.

LAGRANGE (325) reports the case of melano-sarcoma of the conjunctiva already described in the *Rev. d' ocul.*, 1884, No. 4, p. 89, and another from Badal's practice; and from these two, and a few other cases compiled from the literature of the subject, he comes to the conclusions already referred to. He recommends enucleation, although the tumors grow slowly, and seem at first to be benignant. v. MITTELSTÄDT.

HIRSCHBERG and BIRNBACHER (327) removed a row of raspberry-shaped, pale-red neoplasms from the conjunctiva of the globe and lids, which proved to be papillomata.

LABAT (329) observed in a colt, horse-pox of the conjunctiva of the globe and lids, and also of the limbus. They varied in size from that of a pin-head to that of a lentil. They were flattened at

the apex, but without a depression. There were somewhat larger pustules on the nose and upper lids. When a young cow was vaccinated with them, typical cowpox was developed.

KUSCHBERT (330) observed in xerosis of the conjunctiva affections of the respiratory organs, discoloration and dryness of the skin, intestinal catarrhs, and sometimes affections of the gums. Probably the bacilli found upon the conjunctiva and in the tissues are the cause of the disease. He considers xerosis of the conjunctiva and the affections accompanying it a typical infectious disease.

DENK (331) made an anatomical examination of a case of xerosis of the conjunctiva, and found the characteristic microbes.

332. KUHNT, H. Further reports on the healing of deep corneal ulcers threatening to perforate, by covering them with conjunctiva. *Berliner klin. Wochenschr.*, 1884, No. 24.

333. FISCH, R. Linear cauterization : a contribution to the treatment of destructive corneal processes. *Inaug.-Diss.*, Basel, 1884.

334. RAMPOLDI. Un caso di rapida e totale mortificazione dell' occhio. *Ann. di ottalm.*, vol. xiii., 2, p. 458.

335. KIBERSZTOWICZ, F. Combustion of the cornea. *Gazeta Lekarska*, 1884, No. 14.

336. THEA. Dell' applicazione del massagio in alcune affezioni oculari. *Gazz. d. cliniche*, 1884, Nos. 1–3.

KUHNT (332) publishes some more good results obtained by covering corneal ulcers threatening to perforate with conjunctiva, a method first recommended by Berlin and Schöler, and later by himself.

FISCH (333) reports that Prof. Schiess-Gemuseus performs linear cauterization in all cases of destructive corneal processes that are complicated with swelling of the conjunctiva and muco-purulent discharge. He produces a narrow eschar along the whole length of the fornix with a sharpened stick of pure lunar caustic, and then neutralizes.

RAMPOLDI (334) describes a case of total primary necrosis of the cornea, the cause of which he could not discover.

DENTONE.

KIBERSZTOWICZ (335) describes a case of combustion with a glowing pair of tongs. Almost the whole cornea was covered with a white eschar, which was cast off five hours later. No more

irritation the following day. From a report in the *Wjestnik ophthalm.* HIRSCHMANN.

THEA (336) favors massage. Excellent results were obtained with this method in eight cases treated at Bono's clinic (two of blepharitis ciliaris, five of scrofulous affections of the conjunctiva and cornea, one of pannus after trachoma, and one of parenchymatous keratitis). Bono follows Pagenstecher's directions, but uses vaseline instead of yellow ointment. DANTONE.

337. CAMPART. De l'épisclériti. *Thèse de Paris*, 1884.

CAMPART (337) discusses rheumatic episcleritis, which he considers an inflammation of the anterior portion of Tenon's capsule. V. MITTELSTÄDT.

XII.—IRIS.

BY DR. NIEDEN.

338. ALEXANDER. Genuine tuberculosis of the iris and ciliary body. *C. f. A.*, vol. viii., p. 161.

339. CUIGNET. Hémorrhagies antérieures de l'œil opératoires et postopératoires. *Rec. d'ophth.*, Sept., 1884, p. 523.

340. MAKROCKI, F. (Breslau). Anomalies of the iris. *Arch. f. Augenhk.*, vol. viv., 1, p. 73.

341. PFLÜGER (Berne). Case of sarcoma of the iris. *Jahrb. d. Berner Univ. Augenkl.*, 1883, p. 20. Berne, Dalp, 1884.

342. SCHÄFER, H. Anatomical description of an eye with suppurative irido-choroiditis. *C. f. A.*, vol. viii., p. 203.

343. SOUQUIÈRE. La corelyse, étude clinique et critique du procédé du Prof. Förster de Breslau. *Thèse de Lyon*, 1884.

MAKROCKI (340) describes three cases of congenital coloboma of the iris; in one case in one eye only outward, in another inward, and in a third (case of Magnus) one coloboma inward and another on the same eye downward. All the symptoms pointed to a congenital origin, and in cases 1 and 2 are explained as the result of an abnormally situated fœtal fissure. He also reports a case of membrana pupillaris perseverans corneæ adherens in the left microphthalmic eye of a girl of fifteen, in whose right eye there was an ordinary pupillary membrane.

SCHÄFER (342) gives an anatomical description of an eye removed on account of iridocyclitis dolorosa c. amaurosi. When

the globe was opened, a peculiar thickening of the choroid to the extent of 2–3 *mm.* was found in the region between the ciliary body and choroid ; the partially detached retina was united with it. The pathologico-anatomical examination showed that there was well-advanced suppurative irido-choroiditis, which had produced almost total destruction of a circumscript portion of choroid and retina, and gradual change of the products of inflammation into newly formed connective tissue, which projected into the vitreous like a tumor. Hyaline degeneration of Descemet's membrane had taken place, producing thickening of the cornea (colloid degeneration).

ALEXANDER (338) observed genuine tuberculosis of the iris and ciliary body in the left eye of a boy four years old ; it was enucleated after a piece of the infiltrated iris-tissue had been excised and introduced into the anterior chamber of a rabbit's eye. The microscope clearly demonstrated the tuberculous character of the neoplasm, but no bacilli were found. Four weeks after the introduction of the tuberculous piece of iris into the eye of the rabbit, the animal showed diffuse tuberculosis of the iris, a few tubercles in the peritoneum of the liver, and vast numbers of tubercle-bacilli in the iris and ciliary body.

PFLÜGER (341) reports a case of sarcoma of the iris in a woman of fifty-five, which was successfully removed. He also adds a description of the eleven or thirteen cases respectively, which Fuchs does not mention in his "sarcoma of the uveal tract."

CUIGNET (339) discusses the hemorrhages into the anterior chamber during and after operations, their causes, source, and consequences. The most profuse hemorrhages Cuignet observed after "total iridectomy, or extraction of the whole iris," an operation which he performed at least twenty-five times in fifteen years. MARCKWORT.

SOVQUUIÈRE (343) cannot recommend FÖRSTER's corelysis, as the results in all the cases he has seen were unsatisfactory, and even made matters worse. Souquière saw ten good results in fifteen cases of ripening of cataract according to Förster ; in three, iritis ensued. Experiments on rabbits produced total cataract in two cases ; in one, partial opacity of the lens. V. MITTELSTÄDT.

XIII.—CHOROID.

344. CARO. La pilocarpina nelle malattie oculari. *Giorn. internat. de scienz. med.*, vol. vi., 6. Seven clinical histories relating

the good results of injections of pilocarpine in choroidal and retinal exudations.

345. FANO. Relations entre la cataracte polaire et l'irido-choroidite. *Jour. d'ocul.*, Aug., Sept., 1884.

346. GIRARD, C. Choroidite de la macula, considération pathogénique, indications thérapeutiques. *Rev. trimestr. d'ophth. prat.*, p. 6, April, 1884.

347. MACKENZIE (ST.), WARNER, BRAILEY. Chronic tubercle of choroid and brain. *Trans. Ophth. Soc. Unit. Kingd.*, 1883, vol. iii., pp. 119, 126, 129.

348. PFLÜGER, E. (Berne). Metastatic sarcoma of the choroid. *Arch. f. Augenhk.*, vol. xiv., 2, p. 129.

349. SCHÄFER, H. Chronic tuberculosis of the eye. *Zehender's klin. Monatsbl.*, vol. xxii., p. 307.

350. TERSON. Chorio-rétinite grave guérie rapidement par les inonctions d'onguent napolitain. *Rev. klin. d'ocul.*, p. 66, No. 3, March, 1884.

In a case of posterior polar cataract, FANO (345) performed an iridectomy downward. An exudation was found on both sides of the excised piece. V was worse after the operation than before it.

GIRARD (346) observed choroiditis at the macula lutea in two cases of moderate degrees of myopia in persons who took but little exercise, and suffered from congestion of the head and cold feet. He therefore attempted to regulate the circulation by cold douches and long walks. V. MITTELSTÄDT.

In discussing tuberculosis of the uveal tract, MACKENZIE (347) reports the case of a boy four years old, in which the diagnosis of tuberculosis of the brain was made from the presence of tubercles in the choroid, detected with the ophthalmoscope. The autopsy confirmed the diagnosis. WARNER reports a similar case of a child aged nine, in whom the tubercles were recognized with the ophthalmoscope. There was no optic neuritis. In the right eye the disc was reddish. There was general miliary tuberculosis, but no meningitis. Brailey excised and examined the eye of a child aged two. The globe had enlarged rapidly, and the ophthalmoscope showed the retina apparently detached. A tumor the size of a pea was found near the papilla, which proved to be tubercular. A few isolated patches of a similar nature were found in the adjacent sclera. FITZGERALD.

PFLÜGER (348) adds another case of metastatic sarcoma of the choroid to the two already published. The tumor developed in a person aged twenty-nine, from a nævus in the region of the right parotid, attacked the glands, and produced metastases in the back, the scalp, the brain, and the right choroid. It grew for about three years. The left eye became amaurotic from metastases in the brain ; the right, later, from metastases in the choroid. Pflüger also observed amaurosis of the second eye from metastasis in the brain, in a case of primary sarcoma of the choroid in the first.

TERSON (350) saw a girl aged sixteen recover from a severe attack of chorio-retinitis after mercurial inunctions and, later, iodide of potash. The disease had lasted five weeks before treatment was begun, and the patient had only quantitative perception of light. No diastatic cause could be discovered.

V. MITTELSTÄDT.

XIV.—GLAUCOMA.

351. V. ARLT. On glaucoma. With six plates and twelve illustrations. Vienna, 1884, Braumüller. 142 pages.

352. CANT, W. J. Atropine and glaucoma. *Ophth. Rev.*, Sept., 1884, p. 265.

353. DEHENNE. Du glaucome infantile et de sa transformation en glaucome d'adulte. *Rec. d'ophth.*, Aug., 1884, p. 535.

354. JACOBSON, J., Sr. Clinical contributions to the knowledge of glaucoma. *v. Graefe's Arch. f. Ophth.*, vol. xxix., 3, pp. 1–70, and vol. xxx., pp. 165–210.

355. PFLÜGER, E. (Berne). Acute glaucoma, optic neuritis, nephritis, lead-poisoning ; anatomical condition. *Jahrb. d. Berner Univ. Augenkl.*, 1883, p. 35. Berne, Dalp, 1884.

356. PROUT, J. S. Glaucoma simplex in a hypermetropic eye after tenotomy. *Amer. Jour. of Ophth.*, May, 1884.

357. SACHS, TH. Glaucoma produced by homatropine. *C. f. A.*, vol. viii., p. 271.

358. SIMI. Sulla cura medica del glaucoma. *Boll. d'ocul.*, vol. vi., No. 10, June, 1884.

In his monograph on glaucoma ARLT (351) expresses his views as to the nature of this disease, basing them on his own vast experience, numerous experimental investigations, and reports of pathologico-anatomical conditions prepared under his directions. The literature of the subject is fully considered from pre-ophthal-

moscopic times up to the present. He regards glaucoma as primary in its form, and subdivides it into three stages: the stage of stasis, of inflammation, and of degeneration. Arlt firmly supports v. Graefe's theory, that in glaucoma amaurosis is produced by the increase of the intra-ocular pressure. For details *v.* this excellent monograph itself.

JACOBSON (354) summarizes the results of his studies on glaucoma as follows: 1. The disturbance of central and peripheral vision can be explained in chronic glaucoma by the excavation of the optic nerve. The excavation is one of pressure. 2. The marginal excavation is a later symptom. 3. The prodromal stage of chronic glaucoma is characterized by subjective obscurations, excavation of the central canal, dilatation of the pupil, and increased tension. These symptoms may occur either singly or variously combined. 4. Iridectomy is most effective in the initial stage, but frequently fails when the marginal excavation has developed. 5. Accommodative efforts in hypermetropic eyes no longer young assist in producing the initial stage on account of venous stasis. 6. The glaucomatous eyeball retains its hardness after enucleation longer than the normal one. 7. Increase of volume of the vitreous is the cause of the greater hardness. 8. The vitreous presses backward into the central canal and pushes the ciliary processes forward against the insertion of the iris, thus closing Fontana's spaces. 9. The turbidity of the refractive media in acute glaucoma and prodromal attack is an œdema, and not of an inflammatory nature. 10. The obscurations of the initial stage without turbidity of the media indicate venous hyperæmia and arterial anæmia. 11. The increased volume of the vitreous is a constantly acting cause for further venous hyperæmia and œdematous and inflammatory secretion. 12. The transition from acute to chronic glaucoma can be directly explained by the increased tension; from chronic to acute, by passive hyperæmia of the anterior section of the globe, the result of the increased volume of the vitreous.

DEHENNE (353) maintains that infantile glaucoma (hydrophthalmus) can also occur in adults, if the conditions are the same as those in a child—namely, if the sclera is elastic and yields. When, again, the sclera and cornea in a child have been distended *ad maximum*, the excavation of the optic nerve begins: the glaucoma of adults develops. Three clinical histories.

MARCKWORT.

Cant (352) records the case of a woman aged sixty-five, on whose right eye two iridectomies had been performed, so that finally enucleation became necessary. Incipient glaucoma of the left eye was cut short with eserine. When later preparatory iridectomy was performed on account of incipient cataract, a few drops of atropine were instilled into the eye on the eleventh day by mistake, with the result of at once bringing on an attack of acute glaucoma, which again yielded to eserine. Fitzgerald.

Pflüger (355) also saw acute glaucoma develop after instillation of a drop of atropine in a patient who for years had been affected with the prodromi of glaucoma, which readily yielded to eserine. An intercurrent neuritis, due to lead-poisoning, did not influence the course of the glaucoma, neither did a slight albuminuria, which developed afterward. Anatomical description of the globes.

Prout (356) thinks that, considering the fact that the left eye is still good, the operation had an influence in developing the glaucoma in the right eye. Burnett.

Sachs (357) saw glaucoma develop after the instillation of a drop of homatropine for the purpose of examining a hypermetropic eye with the ophthalmoscope. It readily yielded to eserine.

According to Simi (358) medicamentous treatment of glaucoma with eserine, iodoform, massage, and constitutional remedies is possible in those cases in which the disease is due to transient blood or lymph-stasis, and is precipitated by external causes. Of the three cases cited by the author, which were completely and permanently cured by medicamentous treatment alone, two suffered from heart disease, and the glaucomatous attack took place while they were suffering from enfeebled circulation due to the internal use of antimony. In the third case the patient was predisposed through mental excitement, though the immediate cause was the instillation of atropine. Dantone.

XV.—SYMPATHETIC OPHTHALMIA.

359. Drake-Brockmann. Foreign bodies in the eyeball. *Ophth. Rev.*, July, 1884, p. 202.

360. Alt, A. Case of sympathetic neuro-retinitis—remarks on sympathetic ophthalmia. *Amer. Jour. Ophth.*, April, May, 1884.

Brockmann (359) reports four cases. In one of them, in which there was considerable sympathetic trouble, with great defect of V,

very marked benefit followed the enucleation of the injured eye together with the inunction of blue ointment and two-gr. doses of quinine thrice daily. FITZGERALD.

ALT (360) reports a case of sympathetic neuro-retinitis, which developed on the sixth day after enucleation of the offending eye, though symptoms of sympathetic ophthalmia were observed a few hours after removal of the eyeball. The patient was finally discharged with V = $\frac{20}{40}$. BURNETT.

XVI.—LENS.

361. APPENZELLER. Contribution to the knowledge of heredity of senile cataract. *Mittheilungen a. d. ophth. Klinik zu Tübingen* von Prof. Nagel, vol. ii., 1. Tübingen, 1884.

362. BANDON. Des hémorrhagies intra-oculaires après l'opération de la cataracte. *Rec. d'ophth.*, August, 1884, p. 454.

363. CHIBRET. Technique de l'opération de la cataracte. *Arch. d'ophth.*, vol. iv., No. 3, p. 248, and No. 5, Sept., Oct., 1884, p. 444.

364. BULL, C. S. FÖRSTER's operation for the rapid ripening of cataract, with an analysis of thirty cases. *N. Y. Med. Jour.*, May 24, 1884.

365. DRAKE-BROCKMANN. Cataract-extraction. *Ophth. Rev.*, Aug., 1884, p. 229.

366. DUBRUEIL. De l'opération de la cataracte. Clinique faite à l'hôpitale St. Eloi de Montpellier. *Gaz. méd. de Paris*, No. 25, p. 289, June 21, 1884.

367. v. DUYSE. Panophthalmite tardive après une opération de cataracte avec enclosement irien. *Ann. a'ocul.*, vol. xcii., p. 44.

368. FRYER, B. E. Two cases of double congenital symmetrical ectopia lentis in sisters. *Amer. Jour. Ophth.*, May, 1884.

369. GOTTI. Dell' emorragia consecutiva all' estrazione della cataratta. *Riv. clin.*, June, 1884.

370. GRANDELEMENT. Observation de luxation du cristallin. *Rev. d'ocul.*, p. 101, April, 1884.

371. JEGOROW, J. E. Report on 152 extractions of cataract. *Wjestnik ophthalm.*, May and June, 1884.

372. KAZAUROW, J. N. Hemorrhage in the eye after cataract-extraction. *Wratsch*, No. 36, 1884.

373. KAZAUROW, J. N. The question of erythropsia due to aphakia. *Wratsch*, No. 15, 1884.

374. MAKLAKOFF. Un procédé operatoire de la cataracte. *Arch. d'ophth.*, 1884, vol. iv., No. 3, p. 242.

375. MARTIN, G. Hygiène des instruments, qui servent à l'extraction de la cataracte. *Gaz. d'ophth.*, April, 1884.

376. McKEOWN. Treatment of immature cataract. *Ophth. Rev.*, Aug., 1884, p. 238.

377. MITTENDORF, W. F. On Förster's method of artificially ripening cataracts. *Med. Record*, June 28, 1884.

378. NOEDMENN, G. A. (Helsingfors). Case of cataracta Morgagni (hypermatura fluida) with clear cortical liquid. *Arch. f. Augenhk.*, vol. xiv., 2, p. 165.

379. PFLÜGER (Berne). The question of erythropsia. *Jahrb. d. Univ. Augenkl.*, p. 49. Berne, Dalp, 1883.

380. SNELL, SIMON. Thermometry in cataract-extractions. *Ophth. Rev.*, 1884, vol. 3, p. 105.

APPENZELLER (361) assumes various kinds of heredity of cataracts, according to the nearness of relationship, and sifts the extensive literature of the subject accordingly, adding himself eight new cases from the Tübingen ophthalmic clinic. Mediate heredity is that form in which glaucoma, myopia, lues, and diabetes mellitus are transmitted by heredity and thereby disposed to the consecutive development of cataract.

In five of the cases described by BULL (364) plastic iritis followed the operation. In no case was the zonula ruptured. The time for the apparent complete ripening of the cataract after the operation was from six days to five weeks. In the subsequent extraction no case had $V < \frac{20}{100}$. The extraction was not attempted until four weeks after the first operation.

BURNETT.

GRANDELEMENT (370) observed in a case of traumatic dislocation of the lens sudden blindness, while the fundus could not be illuminated. This condition lasted for five hours, when it yielded to eserine; myopia of high degree was then found, which gradually disappeared after the seventh day. The author explains the first symptoms by assuming glaucoma fulminans, and attributes the disappearance of the myopia to the return of the lens to its former position, when it again became attached.

MITTELSTÄDT.

FRYER (368) describes two cases of ectopia lentis. In the one the lenses were dislocated outward, in the other, upward and outward.

NORDMANN (378) reports a case of cataracta Morgagni (hypermatura fluida) with clear, watery, cortical liquid in which V was but slightly impaired, the capsule of the lens being perfectly transparent.

CHIBRET (363) discusses minutely every thing pertaining to the preparation, technique, method, and after-treatment of cataract; then describes the simple linear extraction, in which he only makes a small corneal section, and after removing the cataract, tears the posterior capsule with the cystitome. He also gives his views as to the cause and treatment of accidents after the extraction, and of the various complications in healing. Finally, he discusses the hygiene of the operator and his mode of life, and thinks he should rest one or two days every week and take a vacation both in summer and winter. V. MITTELSTÄDT.

DRAKE-BROCKMANN (365) gives a statistical review of 1,767 cases of cataract-extraction performed by him at the Eye Infirmary, Madras. Various methods were adopted, but mainly one, which he designates as "primary capsule rupture," which he has so named because the initiatory step of the operation is a division of the lens capsule by a stop-needle, the pupil having been previously fully dilated with atropine. He operated 674 cases according to this method, with an unsuccessful percentage of 11.72. The author claims the following advantages for this procedure: 1. It allows a more extensive laceration of the capsule at the same time that the anterior chamber remains replete with fluid. 2. It permits of a more complete exposure, and a more thorough knowledge is gained of the size and character of the cataract. 3. It diminishes the tendency of the iris to contract, even after the corneal section has been completed, and by this means facilitates the escape of the lens. 4. The possibility of more accurately judging of the extent to which the cornea must be divided. 5. Less necessity for the introduction of a traction instrument.

FITZGERALD.

MAKLAKOFF (374) endeavors to make that a method which others seek to avoid in extraction: he seeks to dislocate the lens in the capsule with a sharp hook, after having previously divided the capsule. He attaches special importance to this, maintaining that it facilitates the escape of the lens, and that fre-

quently it is possible to extract the lens in the capsule without loss of vitreous. This kind of success is probably, in most cases, unintentional; and whatever else may happen during this manœuvre and what the results are is not stated, no observations being reported. v. MITTELSTÄDT.

JEGOROW (371) performed 152 operations at the hospital at Sirapul, department of Wjatka, on 125 patients (76 men, 49 women, 24 Baschkirs and Tartars, 101 Russians), 88 hard and 34 soft cataracts, 6 Morgagnian cataracts, 1 cat. nigra, 2 pyramidal cataracts, 2 cat. siliquatæ, 1 chalky lens, 1 secondary cataract. In young persons division was performed (12 cases); in older ones, linear extraction according to Graefe, in 132 cases, and flap-extraction in 6. Strict antiseptics. Iritis with total loss of V in 5 cases after perfectly normal extraction (method not given). In 5 cases suppuration of the wound, exclusively in affections of the lachrymal sac, only two of which lost V completely.

HIRSCHMANN.

MCKEOWN (376) proposes the injection of warm water into the capsule, by means of a hypodermic syringe, for the purpose of loosening the lens and washing away the cortex. Though he has had only three months' experience of this proceeding, he is satisfied of its value, and he has been enabled to undertake operations of which he previously would not have dreamt (!).

FITZGERALD.

MARTIN (375) reports two cases of suppuration after extraction, in which cauterization according to Abadie was without avail. He attributes the infection to the instruments, and therefore recommends (1) that they should not be used in any other operation, and (2) that they should be kept in a special box, which should not be opened until just before the operation. MARCKWORT.

MITTENDORF (377) reports twenty cases in greater or less detail. The time of ripening was from twenty-five days to ten weeks. Serious inflammation of the iris followed the operation in three cases, one of which went on to destruction of the ball. In the twelve cases which have come to extraction, no serious complications arose, and visual results were good. BURNETT.

SNELL (380) recommends measuring the temperature in all cases of cataract-extraction, as experience has shown him that in all cases in which suppuration or severe iritis set in, this was at once clearly indicated by the tracings on the temperature chart, while if the case is progressing well there is no elevation of temperature. FITZGERALD.

BANDON (362) is opposed to the opinion of Fieuzal, Dianoux, and Warlomont, that intra-ocular hemorrhage after extraction always causes panophthalmitis, and that therefore enucleation should be at once performed. BANDON reports two cases of hemorrhage after extraction ; one eye improved again so that the patient could tell the time on his watch with + 15 D ; the other was preserved, but remained blind. ARMAIGNAC expresses similar views (*Rev. clin. d' ocul.*, July, 1884). (BECKER reports a similar case with preservation of the globe. Graefe-Saemisch, vol. v., p. 344.—REV.) MARCKWORT.

GOTTI (369) observed an intravascular hemorrhage after cataract-extraction, which took place immediately after the operation, and next day had filled the whole anterior chamber with blood ; it was absorbed however in the course of a few weeks, so that the patient could be discharged cured. DANTONE.

The right eye of KAZAUROW's (372) patient was totally blind, and had undergone glaucomatous degeneration. In the left eye hypermature cataract, hard nucleus, liquid cortex. Operation—Graefe's linear section ; easy expulsion of the lens within the capsule ; no accidents during the operation. Patient counts fingers. Hygroscopic cotton soaked in a four-per-cent. solution of boracic acid placed on the eye. Two minutes later pain in the eye. Large hernia of vitreous when the eye was opened, soon followed by profuse hemorrhage, which lasted for several days, in spite of bandage and cold applications. When the patient left the hospital the blood had been so far absorbed that the coloboma could be seen. Behind the iris, blood and fibrous tissue ; complete occlusion of pupil probable. HIRSCHMANN.

v. DUYSE (367) reports an interesting case of panophthalmitis after cataract-extraction. The operation was performed August 15, 1883 ; a cystoid scar developed with incarceration of the iris (cyst the size of a pin-head) ; $V = \frac{20}{30}$. As the eye did not remain irritable long, the patient soon attended to his work again. On March 9, 1884, the patient, who the day before had been at work as usual, appeared with a yellowish-brown infiltration of the cornea in the neighborhood of the iris-hernia, turbid aqueous, hypopyon, exudation in the pupil, only quantitative perception of light. Ciliary region painful to touch ; chemosis and moderate œdema of the edges of the lids. Forty-eight hours later total panophthalmitis. Duyse quotes the literature of similar cases of panophthalmitis developing late after the operation.

MARCKWORT.

In KAZAUROW'S (373) case erythropsia began two months after the extraction, as the result of a long walk on a winter's day, lasted a month, extended over the whole visual field, and was most perceptible at night, so that the patient mistook white for red, or pink and green for gray ; it was also very marked in moonlight. The author recommends rest and perhaps the use of blue or gray glasses to dispel it more quickly. He thinks it occurs much more frequently than is generally assumed, as the patients do not mention it (he discovered two more cases by questioning).

HIRSCHMANN.

PFLÜGER (379) adds four cases of erythropsia to the thirteen already published, two of which still possessed their lenses, one of them having artificial mydriasis on account of iritis, the cause being long-continued exposure to strong light. Hyperæsthesia (Benson) of the retina is probably the cause rather than anæsthesia (Hirschler, Purtscher).

XVII.—VITREOUS.

381. MULES. Steel chip removed from vitreous by the electro-magnet. *Ophth. Rev.*, 1884, p. 361.

382. RAMPOLDI. Un caso notevole di sinchisi scintillante del vitreo. *Ann. di. ottalm.*, vol. xiii., 2.

RAMPOLDI'S (382) cases of synchisis scintillans showed no other changes than moderate atrophy of the pigment, and hemeralopia. The latter yielded to tonic treatment. DANTONE.

MULES (381) reports the successful removal of a chip of steel from the vitreous, where it could be seen distinctly with the ophthalmoscope. The incision was made in the sclera through the tendon of the inferior rectus. FITZGERALD.

XVIII.—RETINA, AND FUNCTIONAL DISTURBANCES.

383. BERRY, GEO. A. Temporal hemianopsia. *Ophth. Rev.*, June, 1884, p. 165.

384. BERRY, GEO. A. Tobacco-amblyopia in women. *Ophth. Rev.*, 1884, p. 101.

385. EWETZKY, TH. An anomaly of the retinal venous pulse hitherto not described. *C. f. A.*, vol. viii., p. 167.

386. FORMIGGINI. Sopra un caso di ambliopia saturnina. *Riv. clin.*, No. 6, June, 1884.

387. FORTUNATI. Contributio alla cura dei distacchi retinici. *Gazz. d'ospit.*, Nos. 47 and 49, June, 1884.

388. GUAITA. Anatomie et physiologie pathologique de la rétinite pigmentaire. *Rec. d'ophth.*, June and July, 1884.

389. HIRSCHBERG, J. Amaurosis due to retinitis albuminurica. *C. f. A.*, vol. viii., p. 244.

390. LAKER, CARL. Another case of affection of the eye from a stroke of lightning. *Arch. f. Augenhk.*, vol xiv., 2, p. 161.

391. LUBRECHT, R. (Hamburg). Contribution to encephalopathia saturnina c. amaurosi. *Berl. klin. Wochenschr.*, No. 24, 1884.

392. MORTON. Central amblyopia in a smoker suffering from diabetes. *Ophth. Rev.*, 1884, p. 159.

393. NETTLESHIP and EDMUNDS. Central amblyopia in diabetes, and its dependence on or independence of tobacco-smoking. *Ophth. Rev.*, 1884, p. 165.

394. PANAS. De l'amblyopie toxique. *Union méd.*, p. 657, No. 35, Aug., 1884.

395. SCHMIDT-RIMPLER. Commotio retinæ. Perception of light diminished. *Zeh. klin. Monatsbl.*, vol. xxii., p. 212.

396. SHEARS, CH. Tobacco-amblyopia. *Brit. Med. Journ.*, June 14th, p. 1201.

397. SMITH, PRIESTLEY. Reflex amblyopia. *Ophth. Rev.*, May, p. 129.

398. SWANZY. Hemiachromatopsia. *Ophth. Rev.*, 1884, p. 185.

399. WALTER, ERNST. Clinical studies on detachment of the retina (Prof. Horner's clinic). *Inaug. Diss.*, Zürich, 1884.

EWETZKY (385) observed in two persons an anomaly of the venous pulse of the retina hitherto not described—its transmission to a considerable distance beyond the edge of the disc. The phenomenon disappeared in one case after a few weeks; in the other it was still slightly perceptible. No organic lesions.

GUAITA (388) gives an anatomical description of an eye affected with retinitis pigmentosa. The hyperplasia of the supporting tissue of the retina, though scarcely perceptible, was especially worthy of note. The essential feature of the disease is a chronic inflammation of the adventitia of the retinal blood-vessels.

MARCKWORT.

WALTER (399) reports on 300 cases of detachment of the retina from the clinic of Prof. Horner, with special regard to the etiology of the disease. Only the cases examined with the ophthalmoscope and the uncomplicated ones were considered. In 141 there were more or less marked opacities of the vitreous; in 92 the detachment was below, in 6 in the region of the macula, and in only 2 at the inner side. The disease began suddenly in 52, and slowly in 57 cases. It occurred between the ages of twenty and thirty in 48 cases, between fifty and sixty in 84, between sixty and seventy in 54, and only once in the first decade. Between the ages of twenty and thirty, injuries are generally the cause; later, senile changes in the blood-vessels. The etiology of 144 cases = 48 %, could be ascribed to myopia, especially at more advanced age; of 49 cases, = 16.3 %, to injuries; while the detachment was idiopathic in 28 cases, = 9.3 %; the remaining 79 cases were mostly due to inflammatory processes in the uveal tract. Hemorrhages, therefore, play an important part in the etiology of detachment.

FORTUNATI (387) describes a case of detachment of the retina cured by puncture. After the first puncture with Pravasz syringe, the subretinal exudation escaped into the subconjunctival tissue, but was reproduced in a few days. A second puncture of the sclera with a lance-shaped knife was more successful, as four months later there was no relapse. DANTONE.

HIRSCHBERG (389) reports briefly a rare case of amaurosis due to retinitis albuminurica, observed in a young, cachectic individual, with detachment of the retina in both eyes.

BERRY (383) records two cases. In the first the typical blindness on the temporal side of the field of vision was slowly developed, remained for a considerable time unaltered, and then proceeded to more complete blindness. The second case was that of a woman aged thirty-two, who had for six months been suffering from headaches, constipation, giddiness, and flushing of the head. Menstruation had ceased at the age of 23, and there were no children. O. S., V almost nil; O. D., $\frac{80}{100}$. When next seen the field of vision in each eye was taken, and exhibited well-marked hemianopsia in temporal portion. V in o. u. had improved. At a subsequent visit there was a further improvement of V, though the fields of vision were about the same. The patient's aspect was better, and the headaches, etc., had disappeared. FITZGERALD.

SWANZY (398) describes a case of hemiachromatopsia. A clergy-

man, aged seventy-seven, on rising from bed was attacked with slight vertigo and got to bed again, when he became unconscious and remained so until evening. In four days he quite recovered with some defect of vision and confusion of ideas on making any unwonted effort. Five months later Swanzy found well-marked hemiachromatopsia (left side of visual field), with contraction of color-field on other side. FITZGERALD.

SCHMIDT-RIMPLER (395) describes a case of commotion of the retina produced by a stone striking the eye, in which V was reduced to $\frac{4}{15}$, and a grayish-white discoloration of the fundus around the papilla and macula lutea was visible. Perception of light was very much reduced, a fact to which Schmidt-Rimpler calls special attention, and there was no astigmatism (in opposition to Berlin's view). Recovery after ten days.

PRIESTLEY SMITH (397) brings forward several arguments, anatomical, physiological, and clinical, in favor of the following propositions: 1. That concentric contraction of the field of vision in man is, in all cases, a sign of loss of function in the retina. 2. That hysterical amblyopia, neurasthenic asthenopia, and sympathetic amblyopia are conditions of peripheral anæsthesia, due to reflex contraction of the vessels which nourish the retina.

FITZGERALD.

LAKER (390) describes a case of affection of the eye produced by a stroke of lightning, the patient being totally blind for seven days and then rapidly recovering; there was no severe general paralysis besides. The ophthalmoscope showed neurotinitis and hemorrhages, followed by atrophic degeneration of the macula lutea and slight opacity of the cortex. The papillæ were grayish. Hyperæmia and hyperæsthesia of the conjunctiva persisted still longer. Perception of light was reduced, but not to an equal extent, in both eyes.

After careful observation for the past five or six years, BERRY (384) has met with only three cases of this form of amblyopia in women, and this fact he regards as strong evidence that tobacco is the primary element in the causation of the amblyopia. He finds (1) that alcohol has no direct influence in the causation of the amblyopia; (2) that smoking, at a time when the counter-stimulus of food is absent, more commonly tends to produce it than at other times; (3) that the outbreak is most likely to occur if, along with the want of food, the system, for the time being, is lowered by nervous exhaustion or imperfect nutrition; (4) that the disease is essentially functional. FITZGERALD.

MORTON (392) saw central amblyopia in a smoker suffering from diabetes, Lang and Lawford also, in a man subsequently affected with this disease, while NETTLESHIP and EDMUNDS (393) observed this coincidence in four cases. In all of them there was a central scotoma for red and green of the same extent in both eyes, which extended beyond the point of fixation. V decreased for a month and then became stationary. FITZGERALD.

SHEARS (396) gives in a tabular form the notes of forty cases of tobacco-amblyopia, from which he concludes: (1) That atrophy or the optic nerves is very rarely met with as the result of excessive smoking; (2) that tobacco is the essential agent in producing the failure of sight; (3) that great moderation in smoking, and especially the employment of the mild forms of tobacco, is all that is necessary to ensure recovery. FITZGERALD.

FORMIGGINI (386) thinks he has observed the first case of lead-amblyopia in Italy. The patient, a man aged thirty, had had three severe attacks of lead colic in sixteen years; during a fourth attack his sight became very poor, so that he could not walk alone. After four days V began to improve, but the field of vision was concentrically contracted; V in right eye $\frac{14}{80}$, in left $\frac{14}{60}$. The ophthalmoscope showed marked neuroretinitis in both eyes. The papillæ became normal again in appearance after injections of pilocarpine, the use of morphine and derivative medicines, and central V improved to $\frac{8}{10}$; the field of vision, however, enlarged only slightly. DANTONE.

LUBRECHT (391) describes a case of lead-intoxication with subsequent amaurosis. It developed three months after the first attack of colic, and was preceded by marked encephalopathia. The ophthalmoscope revealed pallor of the left papilla and indistinct outlines of the right. Efforts at accommodation and convergence did not affect the pupil. After three injections of strychnine the pupils again responded readily and V rose to $\frac{3}{5}$, No. 2. Red-green blindness had previously existed.

XIX.—OPTIC NERVE.

400. BOUVIN, M. J. (Hague). Neuritis optica ten gevolge vaan tumor cerebri. *Weekblad*, 1884, p. 45. *Zch. klin. Monatsbl.*, vol. xxii., p. 133.

401. HIRSCHBERG, J. Neuritis retrobulbaris. *C. f. A.*, vol. viii., p. 185.

402. HOCK (Vienna). New cases of neuritis retrobulbaris peripherica (acuta et subacuta). *C. f. A.*, vol. viii., p. 107.

403. LANDESBERG, M. Cases of neuritis retrobulbaris peripherica acuta in both eyes. *C. f. A.*, vol. viii., p. 280.

404. REMAK, B. Case of coloboma of the optic nerve. *C. f. A.*, vol. viii., p. 225.

405. STOOD. Three cases of amaurosis in deformity of the skull. *Zeh. klin. Monatsbl.*, vol. xxii., pp. 248 and 337.

406. STOOD, A. Cases of malformation of the optic disc. *Zeh, klin. Monatsbl.*, vol. xxii., p. 285.

407. STORY, J. S. Optic neuritis. *British Med. Journ.*, June 14, p. 1153.

408. VOSSIUS. Case of atrophy of the optic nerve with a peculiar anomaly of the veins on the papilla in both eyes, and congenital deformity of the skull. *Zeh. klin. Monatsbl.*, vol. xxii., p. 172.

HOCK (402) defines more accurately the affection called by him neuritis retrobulbaris peripherica (acuta et subacuta), the main symptoms of which are painful sensations around the orbit and pain in movements of the eye; he judges from the direction in which movement is most painful or painful alone in what part of the visual field the function of the affected nerve-fibres has been changed or lost. He reports three cases.

HIRSCHBERG (401) also reports a case of neuritis retrobulbaris, six years under observation, in a girl aged seventeen, with $V = \frac{1}{\infty}$ and no reaction of the pupil of the left eye to light. Complete recovery in a month. Six years later the same condition in the right eye, attended with pain on rolling the eye upward and inward. Corresponding defect in the visual field for light and color. Complete recovery.

LANDESBERG (403) observed a case of neuritis retrobulbaris acuta of both eyes in a girl; in the right eye first, with rapid development of amaurosis and the ophthalmoscopic picture of neuroretinitis. Six months later the same condition in the left eye also after a cold. In the left eye the affection was not checked until after the application of a seton in the neck. Nothing is said in regard to the right eye, except that the optic neuritis persisted.

STOOD (406) observed a partial excavation of a small part of the papilla (about 2.44 *mm.* in depth), the bottom of which was traversed by two small blood-vessels, the fundus and V being otherwise normal. There was, however, a paracentral scotoma in

the visual field between the point of fixation and yellow spot. In another case he saw in both papillæ an extensive, deep, physiological excavation, extending to the margin on the temporal side, 3.35 and 2.72 *mm.* deep resp., so that the nerve-fibres were compressed into a narrow, crescentic space. In the right there was also a coloboma of the choroid; in the left slight atrophy of the pigment at the macula lutea. Field of vision normal. Epicritical remarks.

REMAK (404) gives an accurate description of a case of coloboma of the optic nerve, which was limited in the right eye to the optic nerve with V normal. Concentric limitation of the field of vision. It can develop in three ways, judging from the thirteen cases thus far published, four of them by the Reviewer.

BOUVIN (400) reports a case of neuro-retinitis exsud. e causa cerebrali, in which the autopsy revealed: isolated tubercles in the right ventricle, tuberculosis of the choroidal plexus, hydrocephalus internus, chronic basilar meningitis.

STORY (407) reports a case of optic neuritis in a woman aged thirty-two, who had suffered from intense pain in the head; after some time she became unconscious, and when she regained consciousness she found that she had lost the sense of sight and smell. There was also a defect of taste in the anterior portion of the tongue at the right side, and sensation was absent from the right side of the face. FITZGERALD.

STOOD (405) reports three cases of amaurosis in malformation of the skull, one of which, a dolichocephalus, with grayish-white discoloration of both optic nerves, at first had no perception of light, but later seemed to have a little. The second child and the third person were rather brachy-microcephali, with very slight development of the occiput. The pupils reacted; no ophthalmoscopic changes; there probably had been meningitis. In the third case the cerebral functions were normal.

In the case of VOSSIUS (408) of atrophy of the optic nerve it was neuritic in both eyes, which had caused total amaurosis in the right and amblyopia of a high degree in the left eye. It was in causal connection with a malformation of the skull (a kind of dolichocephalus) and secondary degeneration of the optic nerve. The ten cases thus far reported are briefly mentioned. There was also a conglomeration of veins on the lower half of the papilla resembling a glomerulus, the development of which probably was connected with the embryonic blood-vessels of the fetal fissure.

XX.—INJURIES, FOREIGN BODIES (PARASITES).

409. BOURSIER. Blessure par des éclats de plomb fondu projetés dans les yeux. *Journ. d'ocul.*, No. 133, p. 146, Mar., 1884.

410. DUJARDIN. Trois blessures avec corps étrangers de l'œil ou de ses annexes. *Journ. des sci. méd. de Lille*, p. 201, Mar., 1884.

411. FERRIER. Projection de plombe fondu à la surface de l'œil sans brulure de l'organe. *Journ. d'ocul.*, No. 137, p. 185, July, 1884.

412. FRANKE, E. On foreign bodies in the anterior chamber and iris. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 1, p. 211.

413. HIRSCHBERG, J. On division and concussion of the optic nerve. *C. f. A.*, vol. viii., p. 212.

414. LEBER, TH. Observations on the action of a chip of metal which had entered the eye. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 1, p. 243.

415. OGIER. De l'iris au point de vue méd. légal. *Thèse de Lyon*, 1884.

FERRIER (411) removed three pieces of lead weighing twelve, forty, and forty-five *mg.* respectively, from the eyes of a young man who twelve days previously had been struck upon them with molten lead; they had adapted themselves to the shape of the eye. From this Ferrier concludes that the metal struck the eye while still liquid, and explains the absence of combustion by the well-known fact that the moistened hand can be dipped into molten iron without injury. A quantity of tears sufficient to prevent any further combustion would be formed before the lead solidified and cooled off. v. MITTELSTÄDT.

BOURSIER'S (409) case closely resembles that of Ferrier, and the absence of combustion is explained in the same way.

v. MITTELSTÄDT.

In DUJARDIN'S (410) first case a chip of iron three sq. *mm.* in extent perforated the upper lid, so that it projected on the other side; healing of the severe corneal wound after extraction of the chip. In another case a chip of steel one *cm.* long and five *mm.* broad was removed from the orbit of a smith after remaining in for two years. It was not discovered until the eyeball, having become glaucomatous, was enucleated on account of severe pain.

v. MITTELSTÄDT.

After reporting the case of extraction of a bit of stone from the

iris, FRANKE (412) has prepared a very careful bibliography of the cases of foreign bodies in the anterior chamber, 56, and in the iris, 69. Of the former 36 were chips of iron, in 6 of which no purulent inflammation was observed, in 1 it occurred after two weeks together with iritis and cyclitis, while in the iris they were observed in 30 cases, most of them encysted. In 2 enucleation became necessary, in 18 they were extracted with good results. In 9 cases chips of copper were found in the anterior chamber, and in 19 in the iris ; 5 were extracted, once enucleation was performed. In 8 cases the foreign body on the iris was enveloped in an exudation, in 7 of which there was severe inflammation. In 10 cases bits of stone were observed in the anterior chamber, in 7 in the iris, in 5 of which there was severe inflammation. 21 cases of eyelashes, numbering from 1 to 14, are reported, in one of which no evil consequences had followed after 10 years. In the majority of cases cysts developed in the iris. Splinters of wood and thorns were observed in 6 cases, glass and porcelain in 3 in the anterior chamber ; in 1 on the iris. Eyelashes and splinters of glass rarely produced reaction, while with chips of metal the reverse is true, corresponding with the results of Leber's well-known experiments. The chemical action is the more injurious. Although the foreign body may be encysted, this is no guaranty against inflammation, 14 out of 16 encysted foreign bodies giving rise to inflammation later, and necessitating extraction or enucleation respectively in 12 of these. The prognosis for the preservation of the shape of the globe and vision is generally not good ; the foreign body should always be extracted as soon as possible.

LEBER (414) discusses the action of chips of metal which have penetrated into the eye, basing his conclusions on experiments with animals, and compares the symptoms, course, etc., with those of six accurately observed cases of injury in human beings. Leber describes the symptoms following the introduction of asceptic particles of iron and copper in solid or powdered form into the anterior chamber, and concludes that foreign bodies, consisting of oxydizable metal, can themselves produce inflammation, but need not do so always, as the action depends not only on the kind of metal, but also on the position of the foreign body in reference to the vascular parts of the eye. The observations of total absorption of powdered copper and iron introduced into the anterior chamber are of special interest.

HIRSCHBERG (413) briefly reports two cases of injury to the op-

tic nerve, consisting in one in total division from the thrust of a rapier, and accompanied by very slight external symptoms, in the other in contusion in the supraciliary region, received during a severe epileptic attack; in the former total amaurosis resulted with atrophy of the optic nerve; in the latter a relative central scotoma developed with discoloration of the temporal half of the papilla.

OGIER (415) describes the injuries of the iris and their results, and reports thirty-one cases observed at Gayet's clinic, from 1878 to 1880, which are particularly important to the medico-legal officer on account of their prognosis. V. MITTELSTÄDT.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

416. BENSON. Paralysis of some of the ocular muscles, etc., after diphtheria, with remarks on the pathology of the affection. *Ophth. Rev.*, p. 265.

417. BOUCHUT. Etudes d'ophthalmoscopie dans la méningite et dans les maladies cérébrospinales. *Thèse de Paris*, May, 1884.

418. BRUNET. (Tourcoing). Nephrite parenchymateuse avec œdème prédominante à droite et rétinite du même côté. *Journ. des sci. méd. de Lille*, 1884, No. 9, p. 313.

419. CHARPENTIER, AUG. Etude d'un cas d'héméralopie dans le cours d'une cirrhose hypertrophique. *Arch. d'ophth.*, vol. iv., No. 4, p. 370, July–Aug., 1884.

420. DENISSENKO. Ophthalmia albuminurica et œdematosa, Moscow, 1880, p. 26.

421. EDMUNDS and LAWFORD. Optic neuritis in intra-cranial diseases. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iii., p. 138.

422. EPERON. Hémiachromatopsie absolue, avec conservation partielle de la perception lumineuse et de l'acuité visuelle indirecte, dyslexie. Quelgues considérations relatives à la localisations des centres visuels corticaux et aux phénomènes mentaux de la lecture. *Arch. d'ophth.*, vol. iv., 4, p. 356, July–Aug., 1884.

423. FÉRÉ. Traitement de la migraine ophthalmique. *Progr. méd.*, No. 23., p. 454, June, 1884.

424. FITZGERALD. Diseases of the eye and affections of the genital organs in females. *Ophth. Rev.*, 1882, p. 179.

425. GALEZOWSKI. Des troubles oculaires dans l'ataxie locomotrice, paralysie des nerf moteurs de l'œil. Leçons receuillies par Despagnet. *Gaz. des hôp.*, pp. 475, 491, Nos. 60 and 62, March, 1884.

426. GALEZOWSKI. De l'atrophie de la papille ataxique. *Rev. d'ophth.*, May, 1884.

427. GOWERS. Eye symptoms in diseases of the spinal cord. *Discussion of the Ophth. Soc. of the Unit. Kingd.*, 1884, p. 190.

428. JACKSON, HUGHLINS. A case of ocular movements, with vertigo, produced by pressure on a diseased ear. *Ophth. Rev.*, p. 261.

429. JALON. Atrophie du nerf optique consécutive à des oreillons. *Arch. de méd. militaire*, 1883, vol. i., p. 109.

430. LUTZ. Ocular affection during pregnancy and in the puerperal condition. *Mitth. aus d. Tübingen Univ. klin.* von Prof. Nagel, vol. ii., p. 1, 1884.

431. MOORE, A. Influence of the skin and its diseases upon the eye. Wiesbaden, J. F. Bergmann, 1884.

432. MUSSO. Sulle variazioni del diametro pupillare negli epilettici. *Boll. d'ocul.*, vol. vi., No. 8, Apr., 1884.

433. NAGEL. Contribution to the knowledge of the post-diphtheritic ocular affections. *Mitth. aus d. Univ. klin. zu Tübingen*, von Prof. Nagel, vol. ii., p. 1, 1884.

434. NIEDEN, A. Case of affection of the sympathetic nerve in the region of the eye. *C. f. A.*, vol. viii., p. 153.

435. OLE BULL, M. O. The ophthalmoscope and lues. With six plates. Christiania, Malling, 1884.

436. PAGET, W. S. Condition of eye in hay fever. *Brit. Med. Jour.*, 1884, p. 1203.

437. PANAS. Manifestations des maladies générales sur l'appareil de la vision. Rhumatisme oculaire. Leçon faite à l'Hotel Dieu. *Union méd.*, No. 57, Apr. 20, 1884.

438. UHTHOFF. Case of ophthalmoplegia externa of both eyes after diphtheria of the throat. *Berl. Ges. f. Psych. and Nervenkrankh. Berl. klin. Wochenschr.*, No. 24, 1884.

439. WESTFALL, PROF. Case of general paralysis with spinal affection and blindness. *Neur. Centralbl.*, 1884, No. 15.

BOUCHUT (417) reports on the ophthalmoscopic appearance

in twenty-one new cases of meningitis and adds some chromolithographs. He believes that the disturbances of circulation in acute or tubercular meningitis extend also to the optic nerve and retina, and that the ophthalmoscope will show the hyperæmia and inflammation thus induced. v. MITTELSTÄDT.

EDMUNDS and LAWFORD (421) record twenty-two cases of head injuries and intracranial disease. Twenty-one of these proved fatal, and the post-mortem notes are given, and in twenty the notes of the microscopic examination of the optic nerves and discs. The object of the paper is to bring forward further evidence in favor of the opinion already expressed by Edmunds, that the connection between intracranial diseases and optic neuritis is to be found in an inflammation extending down the connective tissue and blood-vessels of the nerve, and that double optic neuritis with cerebral symptoms means meningitis about the base of the brain, which may be primary or secondary to a tumor or some other disease of the brain-substance itself. The results are summed up as follows: (1) Optic neuritis is present in all in which there was obvious meningitis; (2) In one case at the post-mortem no meningitis was noted, microscopic examination subsequently showed that the meninges were inflamed; (3) There was no case of optic neuritis in which the meninges at the base were shown by the microscope to be free from inflammation.

FITZGERALD.

EPERON'S (422) case was that of a man aged seventy, who awoke a year ago with right-sided hemiparesis, which disappeared again, with the exception of a sensation of slight numbness in the right arm. When the patient came on account of the dyslexia which had existed since then, he was found to be almost completely word-blind. His field of vision for white was normal, but in the right half he was totally unable to distinguish colors, which seemed gray; perception of light and eccentric vision were also here greatly reduced, so that he could not read even large type; the dyslexia is therefore a purely cerebral symptom. The other functions of the eyes are normal, also the fundus. He is sound in mind and body. After accurately describing the individual symptoms Eperon makes some remarks as to the probable seat of the affection, which probably is due to embolism or apoplexy, and on the relative position of the centres of color, light, and form. As they are in close proximity to the centres of sound and graphic images, the well-known cases of double perception (association of

sound with conceptions of form and color) become more intelligible. v. MITTELSTÄDT.

MUSSO (432) concludes from measurements of the diameter of the pupil in seventy epileptics (sixty men and ten women) and twenty healthy persons, that the pupils of the former do not show any noteworthy dilatation. The diameters of the two pupils are different in 22.8 per cent., more frequently in the psychic than in the classical form of epilepsy. Accurate observations of twenty patients made for a whole month before, during and after the attack, show that in one group of these patients the difference in width of the pupils precedes the attack, and disappears again when it is over. The frequent changes in the width of the pupils of some epileptics are not of such general occurrence as to be of true diagnostic importance. DANTONE.

NIEDEN (434) reports a case of affection of the sympathetic nerve, which began, after a rapid cooling off of the heated head, in the territory supplied by the supraorbital nerve, and manifested itself in contraction of the pupil and palpebral fissure, sinking back of the globe into the orbit, and total anhidrosis of the skin of the brow and lids. There was also a certain degree of hyperæsthesia. The temporal artery of the affected side showed distinctly vascular paralysis, as could easily be shown by the curves, the first of this kind published. The patient gradually improved in the course of a few months.

WESTFAL'S (439) case of general paralysis, with spinal affection and amaurosis occurrred in a person whose V began to decrease two years after the first general symptoms, followed by discoloration of the disc, and two years later total blindness. The patellar reflex was always absent. A year and a half later, mania, and death in collapse. Gray degeneration of the posterior columns in the cervical and lumbar portions ; no disseminate alterations.

GALEZOWSKI (425 and 426) believes that paralysis of the ocular nerves frequently is the initial symptom of tabes, and recommends iodide of potass. (6–7 grm. daily), being a supporter of Fournier's theory as to the pathogeny of tabes. He also recommends subcutaneous injections of auro-potass. cyanat (0.2:10 aq., five drops at first, and increasing to fifteen) for the atrophy of the optic nerve accompanying the disease. At present he is experimenting with auro-potass. bromat. According to Galezowski, the central artery and vein may preserve a normal appearance and calibre in tabetic atrophy of the optic nerve when the atrophy is already

complete, as the optic nerve is nourished by capillaries coming from the meninges, and the central blood-vesssels are of only secondary importance in this respect. In opposition to Leber, according to whom the atrophy advances from the periphery of the transverse section of the optic nerve towards the centre, Galezowski asserts that this is not always the case, isolated, atrophic spots being found at times. He agrees with Fournier, in opposition to Charcot, in ascribing tabes in many cases to syphilis. MARCKWORT.

GOWERS (427), who opened the discussion at a special meeting of the Ophthalmological Society, considered there were two subjects to which especial attention should be directed, viz.: "Optic nerve atrophy" and "Internal ocular paralysis." He observes that it is strange that although degenerations of the spinal cord are so numerous, it is only with one, namely, locomotor ataxy, that eye-symptoms are chiefly associated. As to the proportion of cases of tabes in which optic atrophy occurs, G., by his statistics, found it equal to 20 %, but he concluded this was due to accidental circumstances, and that the estimate he gave some years ago, namely, 15 %, was nearer the truth. In his experience atrophy occurs more frequently in the early period of the disease. Like atrophy, paralysis of the internal muscles is more frequent in ataxy than in other spinal diseases. The Argyll-Robertson phenomenon is the most frequent. Observations show that these paralyses generally occur in the early stages of the disease, and that those cases which escape in the early stages are sure to be attacked later. Erb's statement, that loss of the reflex dilatation of the pupil on stimulation of the skin is usually associated with loss of the light reflex, though true as regards a number of cases, is not true of all. G. has seen several in which there was no contraction to light, but well-marked dilatation on stimulation of the skin. He has not met with this affection of the intra-ocular muscles in any other disease limited to the spinal cord. Lewis communicated a paper on ocular symptoms occurring in general paralysis of the insane, from an exhaustive examination of sixty cases. Impairment of reflex dilatation of pupil to cutaneous stimulation he found to be the most frequent anomaly (63 %). A large proportion (28 %) exhibited the singular phenomenon of an active initial contraction of the pupil during focal illumination, and subsequently a dilation to its full extent under sustained illumination. In the discussion which followed, numer-

ous cases of optic neuritis ending in atrophy were reported. Gunn believes that optic neuritis does not always lead to blindness, that there may be temporary arrest, and even slight improvement. Nettleship shared the belief of Gowers, that the optic nerve lesion in spinal diseases is probably not continuous with the changes in the cord. Out of a total of 76 cases of optic atrophy, he found 38 had undoubted locomotor ataxy, and 20 others were suffering from some other form of chronic spinal disease, or from mixed cerebral and spinal symptoms. N. believes that in locomotor ataxy the atrophy almost always begins in one eye before the other. (*Ibid.*, p. 190.)

BRUNET (418) reports a case of parenchymatous nephritis, in which the œdema was confined almost exclusively to the right side of the body, and the right eye showed albuminuric retinitis. This case is similar to some published by Potain (*Gaz. des hôp.*, Feb. 17, 1883), and another published by Yvert (*Rev. d'ophth.*, March, 1883). In Potain's cases a unilateral œdema developed in the lumbar region after contusion, which was ascribed to one-sided sympathetic inflammation, produced by an affection of the kidney of the same side. Yvert found in his case only one kidney when he made the autopsy, which belonged to the œdematous side of the body. V. MITTELSTÄDT.

OLE BULL'S (435) paper on the ophthalmoscopic manifestations of lues as primary symptoms in the fundus, deserves attentive reading. Illustrated.

BENSON (416) considers that the results of modern research seem to point to the great nervous centres as the seat of the lesion which produces the paralytic sequelæ of diphtheria. As regards the nature of the lesion, he appears to favor the view that it is the occurrence of small hemorrhages. FITZGERALD.

NAGEL (433) observed slight optic neuritis, with grayish turbidity of the retina around the papilla, and hyperæmia of the blood-vessels following diphtheria of the pharynx. Function was only slightly impaired; recovery always complete. Probably the optic nerve had been invaded by micro-organisms.

UHTHOFF (438) presented a boy aged ten, in whose right eye total ophthalmoplegia of all the muscles developed, with paralysis of the soft palate, and of accommodation four weeks after diphtheria of the pharynx, while in the left only the external rectus retained slight mobility. Moderate degree of ptosis in both. Improvement after the lapse of twenty days; the power of ac-

commodation returned a few days earlier. The patellar reflex was absent from the beginning, and the lower extremities were extremely weak; the upper, less so. The pupils reacted.

JALON (429) observed in a young soldier neuritic atrophy and amaurosis of the right eye, after mumps. The visual disturbance did not begin until after the primary affection had run its course. V. MITTELSTÄDT.

PAGET (436) attaches great importance to the protection of the eyes in the treatment of hay fever. Conjunctival irritation he finds as a rule precedes by some days the nasal irritation, and consequently the wearing of goggles or a veil is of advantage, not only as a method of shielding off the pollen, dust, and wind, but also as a protection from the glare and heat. FITZGERALD.

PANAS (437) places keratitis profunda among the rheumatic affections of the eye, and also attributes a muco-purulent conjunctivitis to the same cause. He has, however, never observed in rheumatism the purulent conjunctivitis described by Perrin, which rapidly runs its course. V. MITTELSTÄDT.

CHARPENTIER (419) examined with his photoptometer, described in the *Arch. d'ophth.*, vol. iv., No. 3, p. 210, the perceptivity of light of a man aged twenty-two, with hemeralopia in hypertrophic cirrhosis of the liver. He found it reduced to $\frac{1}{30}$ to $\frac{1}{60}$ of the normal. Contrary, however, to the behavior of the normal eye, whose perceptivity of light increases in the dark, that of the hemeralope decreased considerably. It is worthy of note also that the hemeralopia preceded the affection of the liver, and was followed by icterus, lasting through the whole course of the disease, which terminated fatally after twenty months. V, field of vision, and color sense were normal. The fundus was very pale; the edges of the disc in the left eye slightly blurred.

V. MITTELSTÄDT.

FITZGERALD (424) discusses the disturbances of vision attending affections of the genital organs in women, and calls attention to the consequences of masturbation in females. Lutz assumes for the occurrence of ocular affections during pregnancy causes which must be sought in the change of circulation and nutrition due to pregnancy, especially in the changed composition of the blood, and in the complications usually occurring during gravidity and in the puerperal state. As such he mentions (1) albuminuria, where retinitis albuminurica has been observed in every month of pregnancy. With the disappearance of the albuminuria after the

puerperium, the retinitis also vanishes. The frequent occurrence of detachment of the retina probably stands in connection with the general tendency to œdema: recovery is generally complete. (2) Icterus, the result of catarrh or acute yellow inflammation of the liver, with amblyopia, and even amaurosis. (3) Embolic processes in puerperal fever, with or without endocarditis. (4) Profuse hemorrhages, frequently followed by amaurosis and atrophy of the optic nerve; recovery rare. Temporary disturbances of vision, such as amblyopia, central scintillating scotomata, hemianopsia, hemeralopia, and achromatopsia are the result of anæmia or hyperæmia of the brain, though they can also be ascribed to reflex action from the uterus. Pregnancy probably produces also a tendency to hemorrhages into retina and vitreous.

MOOREN (431) endeavors to present in a systematic manner the influence of the skin, both physiological and pathological, as a cause of visual disturbances, an endeavor in which the large material at his command is of great service.

FÉRÉ (423) observed after bromide of potash a diminution of the attacks in those cases of ophthalmic megrim, which were accompanied by aphasia, monoplegia, hemiplegia, and partial epilepsy, but only when material central lesions were improbable.

V. MITTELSTÄDT.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1884.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE COÖPERATION OF

C. E. Fitzgerald, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

440. Berthold. Phlegmon de l'œil. Enucléation du globe chez une femme enceinte de sept mois. *Gaz. méd. de Paris*, p. 448.

441. de Candolle. Hérédité de la couleur des yeux dans l'espèce humaine. *Arch. des sci. phys. et natur.*, Genève, Aug., 1884.

442. Dujardin. L'examen ophthalmoscopique chez les tout jeunes enfants. *Jour. des sci. méd. de Lille*, 1884, No. 15. Uses a slight chloroform-narcosis for examining little children with the ophthalmoscope.

443. Haltenhoff. Courte notice historique sur Jacques Daviel. *Rev. méd. de la Suisse rom.*, 1884, No. 10. Communication on Daviel's grave.

444. KOTELMANN. The eyes of 23 Singhalese and 3 Hindoos. *Zeitschr. f. Ethnol.*, 1884.

445. REICHARD. Air, light, and sound, and their relation to school hygiene. Riga, 1884, Kymmel.

446. SCHUBERT. The present stage of the discussion of the proper position in writing.

447. WARLOMONT. De l'empirisme en ophthalmologie. *Ann. d'ocul.*, vol. xcii., p. 285.

BERTHOLD (440) observed very painful contractions of the uterus while enucleating the eye of a pregnant woman without narcosis.

DE CANDOLLE (441) considers transmission of the color of the eyes the rule. Among 578 observations of brown, blue and grayish-blue eyes, this fact was noted in 88.4-per-cent. In 11.6-per-cent. it was absent, but was found again in the grandparents, as far as investigations could establish this. When the color of the father's eyes differs from that of the mother's, the brown is generally transmitted, so that this color becomes more common from generation to generation, as has been shown statistically also for the color of the hair. V. MITTELSTÄDT.

Of 46 eyes of Singhalese KOTELMANN (444) found 58.7-per-cent. hypermetropic, 41.3-per-cent. emmetropic and none myopic. Although a comparatively large number of Singhalese can read and write, not one was myopic. There was no color blindness. The hair was always black, the iris brown.

SCHUBERT (446) considers the position of the book to the right in writing equally injurious to the eye and spine, but highly recommends the straight median position. He criticises particularly Berlin-Rembold's views; a discussion of this criticism however would lead too far.

b.—STATISTICAL PAPERS.

448. CHODIN. Short report on the ophthalmic clinic of the University of St. Wladimir, at Kiew, for the twelve years of its existence, from 1870 to 1883. *Wjestnik Ophth.*, Oct., 1884.

449. INOUYE. Private ophthalmic clinic. Report for the year 1884. Tokio, 1885. An appeal is added to the oculists of Europe for assistance and advice. 3,671 patients were treated; 9 extractions; 100 iridectomies.

450. JANY. Twentieth annual report on Dr. Jany's ophthalmic clinic. Breslau, 1884.

451. MARLOW. Statistical report of the ophthalmic department for the year 1883. *St. Thomas Hosp. Rep.*, vol. xiii.

452. PFLÜGER. Opthalmic clinic of the University of Berne. Report for 1883. Berne, 1885.

453. RAMPOLDI. La clinica oculistica di Pavia per gli anni scolastici 1882–83 et 1883–84. *Rendiconte Ann. di ottalm.*, vol. xiii., 5, 6.

454. REICH. Statistics of the blind of Russia. *Centralbl. f. pract. Augenhk.*, Oct., 1884.

455. STEFFAN. Twenty-second annual report of the ophthalmic Institute at Frankfort-on-the-Main. 1884.

The number of patients treated from 1870–76 under the direction of Prof. Iwanoff, whose private patients are included, was 11,900 with 14,722 diseases; 787 indoor patients. On the latter 819 operations were performed, among them 474 extractions. From 1876 to 1880, under the direction of Prof. Mandelstamm, (whose private patients are not included,) 4,054 ambulatory with 4,576 diseases, and 456 indoor patients, upon whom 491 operations were performed, among them 236 extractions. 1881–82 under the direction of Prof Chodin, 1,669 ambulatory patients with 1,241 diseases, and 137 operations, 183 indoor patients, 181 operations, among them 70 extractions. HIRSCHMANN.

JANY (450) treated 4,116 patients and operated 72 senile cataracts according to v. Graefe; 3 moderate results, 6 failures. Ten senile cataracts were extracted within the capsule, of which 6 were good, 3 moderate results, and one a failure. On the iris, 90 operations were performed; 7 sclerotomies in glaucoma, 14 enucleations, 25 operations on the muscles.

At the ST. THOMAS HOSPITAL (451), 3,150 new patients were treated; 280 operations. 42 senile cataracts were extracted, exact statistics of which are added.

At BERNE (452), 961 eye-patients were treated in the dispensary; the largest number was treated in May, the smallest in October. 276 operations were performed. 77 uncomplicated senile cataracts were extracted, according to v. Graefe, with only one failure. 6 cataracts were extracted within the capsule with good results. The optic nerve was stretched in a case of tabes, but unsuccessfully. Reports of several cases are added, and a treatise on erythropsia.

In the clinic at PAVIA (453), 3,063 patients were treated from 1882 to 1884, 2,475 in the dispensary. 732 operations were performed, among them 137 extractions (6 losses). DANTONE.

Reich (454) observed in the dispensary at Tiflis, from 1879 to 1882, 3.7 per cent. of persons blind in both eyes among all the eye-cases, and in his private practice 1.5 per cent. Blennorrhœa neonatorum was the cause in 27 per cent. of all cases brought into the dispensary. Affections of the outer parts were the cause in 65 per cent., of the inner parts in 35 per cent. According to the official report for the district of Kiew there are only 6 blind among every 10,000 Jews, and 22 among every 10,000 Christians—a ratio which differs very much from that which has been found for Germany.

Steffan (455) treated 5,954 new patients, and performed 513 operations. 22 senile cataracts were operated, all with good result, except one, a failure.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

456. Baas. General disturbances due to the wearing of cataract-glasses. *Klin. Monatsbl. f. Augenhk.*, Oct., 1884.

457. Dubois. Effets produits par l'anasthésie chloroformique prolongée sur les milieux réfringents de l'œil. *Soc. de biol.*, Jan., 1884 ; *Jour. d'ocul.*, June, 1884.

458. Grahamer. Contribution to the pathological anatomy of congenital hydrophthalmus. *Arch. f. Ophth.*, vol. xxx., 3.

459. Haab. Further reports on tuberculosis of the eye. *Klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 391.

460. Michel. Chemical composition of the lens-substance. Internat. med. Congress at Copenhagen. *Centralbl. f. prakt. Augenhk.*, Nov., 1884, p. 332.

Baas (456) observed headache, dizziness, and choking sensations when cataract-glasses of different focus were worn in a reversible frame.

Dubois (457) saw the ophthalmoscopic image of the fundus become irregular and distorted in persons under the influence of chloroform, which, as shown by the keratoscope, is due to irregular corneal astigmatism, not produced, however, by irregularities on the surface, which disappeared again on the return of sensibility. The refraction was found to have been reduced 4–5 D in a narcotized dog after the disappearance of the reflex action of the pupil.

v. Mittelstädt.

GRAHAMER (458) cannot agree with Horner, Mauthner, and others in assuming every case of congenital hydrophthalmus to be one of congenital glaucoma. His investigations demonstrated the absence of inflammation and occlusion of the iris-angle, the test for the existence of glaucoma. He therefore believes that a uveitis or serous cyclitis respectively is the primary cause, to which all the other symptoms are secondary.

MICHEL (460) found three albuminous substances in the lens. When a senile cataract forms the albumen disappears, and only globulines are found.

b.—GENERAL THERAPEUTICS.

461. ABADIE. Des opérations qui se pratiquent dans un but esthétique sur les yeux perdus, difformes et douloureux. Leçon recueilli par M. Toupet. *Gaz. méd. de Paris*, 1884, No. 48.

462. BEAUDON. A propos de l'extraction au moyen de l'aimant des fragments de fer et d'acier dans l'œil. *Rev. clin. d'ocul.*, Aug., 1884.

463. MAGAWLY. On antiseptics in ophthalmology. *Petersb. med. Wochenschr.*, 1884, p. 200. The results are much better since the introduction of antiseptics.

464. MEYER. The artificial ripening of cataract. Internat. med. Cong. at Copenhagen. *Centralbl. f. prakt. Augenhk.*, Nov., 1884, p. 332.

465. SCHWEIGGER. Resection of the optic nerve. *Ber. über d. Heidelb. Ophth. Gesellsch.* Rostock, 1884.

ABADIE (461) recommends Critchett's operation only in children with hydrophthalmus, and Knapp-Wecker's method in young persons, provided there is no danger of sympathetic ophthalmia. He believes that exenteration of the globe as recommended by Graefe may be substituted for the enucleation which otherwise would become necessary; enucleation need therefore be done only when sympathetic ophthalmia has begun, and for tumors.

BEAUDON (462) considers the magnet insufficient for the removal of very small bodies from the interior of the eye, as its power of attraction is directly proportional to the mass of the foreign body. v. MITTELSTÄDT.

MEYER (464) highly recommends Förster's method of artificial ripening of cataract. Not only slowly ripening cataracts with

hard nucleus are suitable for this operation, but also soft cortical cataracts. The lens may become opaque either at once or gradually.

SCHWEIGGER (465) considers resection of the optic nerve as good a protection against sympathetic ophthalmia as enucleation, and therefore recommends it.

III.—INSTRUMENTS AND REMEDIES.

a.—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

466. ALBERTOTTI. An autometric, self-registering perimeter. *Klin. Monatsbl. f. Augenhk.*, Dec., 1884, and *Ann. d'ocul.*, vol. xcii., p. 198.

467. ARMAIGNAC. Blépharostat à détente instantanée, se plaçant et s'enlevant avec une seule main. *Rev. clin. d'ocul.*, No. 11, p. 268.

468. BUCKLIN. A new polariscope for testing pebble lenses. *Amer. Jour. of Ophth.*, vol. i., No. 6.

469. CULBERTSON. Iriscystome. *Amer. Jour. of Ophth.*, Oct., 1884.

470. GRADENIGO. Occhiale elettrico. *Boll. d'ocul.*, vol. vii., Sept. 1, 1884.

471. KÖNIG. A new apparatus for diagnosticating color-blindness. *Centralbl. f. prakt. Augenhk.*, Dec., 1884.

472. NIEDEN. Leucoscope. *Ber. über d. deutsche ophth. Ges. zu Heidelberg.* Rostock, 1884.

473. SCHMIDT-RIMPLER. Refraction-ophthalmoscope. Internat. med. Congr. at Copenhagen. *Centralbl. f. prakt. Augenhk.*, Nov. 1884, p. 332.

ALBERTOTTI (466) describes a self-registering perimeter, with which the (presumably intelligent) patient can examine himself, but which will hardly be adopted by practical oculists. As the patient always knows from what side the object approaches, and what its color is, he can easily deceive himself. His visual charts differs materially, but not advantageously from the one in general use.

ARMAIGNAC (467) describes a speculum which was constructed by Mathieu eight years ago ; it is very practical, and can be removed with one hand by compressing it. As early as 1872 a very

similar one was used in some clinics. Noyes demonstrated it in 1872 at Wiesbaden. MARCKWORT.

CULBERTSON'S (469) instrument is intended for cutting out a triangular bit of the iris or lens-capsule, and is specially adapted for secondary cataract and iritic adhesions. BURNETT.

GRADENIGO (470) has constructed an electric pair of spectacles by attaching to an ordinary pair two couples of small electromotors of zinc and copper. One element is attached with springs to the outer end of the frame which press it against the temples, the second pair forms the covering of the bridge. Perspiration and the humidity of the atmosphere produce a weak electric current. DANTONE.

NIEDEN (472) recommends the ophthalmo-leucoscope constructed by Helmholtz and improved by König, for testing for color-blindness. It has the advantage that the colors of the spectrum can always be used, and that every patient can state at once with the greatest ease and accuracy what colors appear to him alike.

SCHMIDT-RIMPLER (473) explains his well-known refraction-ophthalmoscope (examination of the inverted image). It has the following advantages: 1. the examiner need neither know nor relax his accommodation; 2. the maximum of distinctness of the image can be determined with greater accuracy; 3. it is not necessary to approach closely to the patient; 4. the refractive condition of the macula lutea can be determined with special accuracy by this method.

b.—REMEDIES.

474. ALBINI. Considerazioni ed osservazioni pratiche sui colliri. *Atti di R. Accad. med. chir. di Napoli.*, 1884, No. 2.

475. BONO. De cloridrato di tebaina nella terapia di alcune affezioni del nervo ottico. *Gaz. de clin.*, vol. xx., p. 39.

476. LANGE. Antiseptics in cataract-extractions. *Klin. Monatsbl. f. Augenhk.*, Nov., 1884.

ALBINI (474) desires a more scientific classification of the collyria. His experiments to replace nitrate of silver with nitric acid (2–5) proved satisfactory to him. DANTONE.

BONO (475) has made comparative experiments on guinea-pigs with the alkaloids of opium, and obtained the following smallest doses for acute poisoning after subcutaneous injections: for every kilogr. of the animals the action is the same of 30 parts of

thebaine, 120 of codeine, 580 of morphine, 600 of narcotine, and 640 of papaverine. A 2½-per-cent. solution of thebaine dropped into the conjunctival sac has a powerful myotic action, which begins after half an hour and lasts 4½ hours. In other respects it acts similarly to strychnine. He used it with good results in alcohol- and tobacco-amblyopia, blinding of the retina, atrophy of the optic nerve as the result of general paralysis or exhausting disease, and neuro-retinitis. It failed in affections of the optic nerve due to syphilis. In collyria he used the 3-per-cent. solution; for subcutaneous injections, 0.001–3; internally in pills two to four times daily, 0.001. DANTONE.

IV.—ANATOMY.

a.—GENERAL ANATOMY.

477. EUSTACHE. Fœtus cyclope. *Jour. des sci. méd. de Lille.* July, 1884, No. 13.

478. HILBERT. The embryological changes of the refractive media and the fundus of the eye of the cat after birth. *Arch. f. Ophth.*, vol. xxx., 3.

479. POUCHET. Organes visuels des êtres unicellulaires. *Soc. de biol.*, meeting of Oct. 27, 1884. *Gaz. hebd. de méd. et de chir.*, 1884, p. 726.

480. SCHIESS-GEMUSEUS. Four cases of congenital anomalies of the eye. *Arch. f. Ophth.*, vol. xxx., 3.

481. VON SCHULTÉN. Experimental investigations on the circulation of the eye and on the connection between it and that of the brain. *Arch. f. Ophth.*, vol. xxx., 3. Results rather meagre.

EUSTACHE (477) describes a fœtus of eight months which was well developed in all its parts except the head. The eye was concealed under a club-shaped process, the rudimentary nose, which sprang from the middle of the forehead. The four lids, of which only the upper ones were united, form a rhomboidal cleft 1 *cm.* long and 5 *mm.* high. Meibom's glands and lashes were found, the latter only above. In the lower angle something resembling the caruncula. Of the lachrymal canals only the right was developed to the extent of 3 *mm.* The eyeball, embedded in a large mass of fatty tissue, had a conico-cylindrical shape, was flattened vertically, and had a circular furrow marking the line of union. There was no cornea; optic nerve very thick; some

muscles found, but they were abnormal in arrangement and direction. In the interior a partition dividing the eyeball into two unequal parts; on the right side there was a lens, on the left it was only indicated. The choroid covered the whole inner surface of the sclera. No anterior chamber. v. MITTELSTÄDT.

HILBERT (478) found that the eye of the young cat is not fully developed until two months after birth. The refractive media remain turbid for a long time after birth, and the tapetum, with its metallic lustre, does not begin until a month after birth. On the lens blood-vessels can be seen, which belong to the capsulo-papillary membrane, a remnant of the vascular covering of the lens at an early stage of development. There was no real pupillary membrane.

POUCHET (479) thinks that some granula lying behind the region of the mouth are the visual organs of some unicellular animals belonging to the group of peridynia. They are black dots of pigment on a hyaline mass resembling a pumpkin. They seem to guide the animal in its movements. P. Bert thinks these organs may be intended not for sight, but for illumination.

v. MITTELSTÄDT.

SCHIESS-GEMUSEUS (480) describes cases of anophthalmus, coloboma oculi, hydrophthalmus with keratoglobus, and congenital staphyloma of the cornea.

b.—IRIS, VITREOUS, LENS.

482. EVERSBUSCH. Comparative anatomical examinations on the finer structure of the muscles of the iris, with special regard to the question of a dilator. *Ber. über d.* 16. *Versamml. d. ophth. Ges. in Heidelberg*, Rostock, 1884.

483. HAENSELL. Recherches sur le corps vitré. *Bull. des quinze-vingts*, vol. ii., 3.

EVERSBUSCH (482) has found that a dilator of the pupil does not exist either in the form described by Henle-Merkel, or in that described by Grünhagen, Schwalbe, and Eversbusch. The sphincter does not send any ramifications to the periphery of the iris. In animals with slit-shaped pupils the elements of the sphincter radiate in a marked manner toward the periphery of the iris from the two ends of the longer diameter of the pupil.

HAENSELL (483) studied the changes which the hyaloid membrane and vitreous undergo when irritated chemically or mechanically. The principal change consists in thickening of the vitreous

tissue, the same as in inflammation of the uveal tract and retina. When no adhesion exists between the hyaloid membrane and retina, the former becomes detached and the vitreous shrinks toward Cloquet's canal; but when the two membranes are united, the central canal dilates and the vitreous thickens towards the retina. When only partial adhesion exists the changes correspond. To bring about detachment of the retina the cells of the vitreous must be converted into connective tissue.

V. MITTELSTÄDT.

c.—RETINA, OPTIC NERVE, BRAIN.

484. ANGELUCCI. Sul decorso delle fibre nel chiasma dei mammiferi e sul centro visivo delle cortece cerebrali. *Gaz. med. di Roma*, vol. x., Oct. 20, 1884.

485. RAMPOLDI. Materiale da servire allo studio istologico della retina dei mammiferi. *Ann. di ottalm.*, vol. xiii., 5.

486. UHTHOFF. The course of the fibres of the optic nerve. *Ber. über de* 16. *Versamml. d. ophth. Ges. in Heidelberg*, Rostock, 1884.

According to ANGELUCCI (484) there is almost a total decussation of the fibres of the optic nerve in the rabbit, a semi-decussation in the lower parts of the chiasma in man and the dog. The author has accurately measured and microscopically examined the optic nerves of two persons suffering from one-sided atrophy of the nerves. In regard to the centre of vision the author has found that when the second gyrus of the dog is destroyed, sensitive blindness of the eye of the other side results, while the eye of the same side becomes slightly amblyopic.

DANTONE.

RAMPOLDI (485) describes the methods of treating histological specimens of the retina, with special regard for the intergranular layer.

UHTHOFF (486) assumes that the optic nerve is a slightly twisted strand, in which the fibres of the periphery take a slightly spiral course, while the papillomacular bundle forms the axis of the optic nerve in its posterior part, but farther forward gradually turns outward and finally lies in the papilla like a wedge, the apex towards the central blood-vessels.

V.—PHYSIOLOGY.

a.—GENERAL PHYSIOLOGY.

487. SAMELSOHN-BJERRUM-BULL. Importance of testing the sensibility for light in practical ophthalmology. Internat. med. Cong. at Copenhagen ; *Centralbl. f. prakt. Augenhk.*, 1884, p. 330.

b.—CORNEA.

488. AUBERT. Does the curvature of the cornea approach most nearly to the ellipse ? *Arch. f. d. g. Phys.*, vol. xxxv., p. 597.

AUBERT (488) has found on the cornea two zones of different curvature, a marginal zone and a polar zone ; the curvature of the flat marginal zone rapidly increases and passes over into the strongly and almost evenly curved polar zone. The marginal zone adapts itself to the anatomical conditions of the eye, while the polar zone fulfills the optical conditions. The shape of the eyeball is such that the part enclosed by the sclera about represents a sphere with a radius of 11–12 *mm.;* the cornea then begins at the margin of the sclera with the same curvature as that of the latter, and then gradually merges in the corneal section of greater curvature, in that zone of the cornea which is of no consequence for optical purposes, as the rays of light falling upon it are shut off by the iris. Then follows that part of the cornea which is of importance for vision ; it extends from 12° to 16° all around the line of vision, and is so curved that the rays of light falling upon it are concentrated upon the retina. This polar zone may, therefore, be called the optical zone, the marginal one, the scleral zone. The bounding line between them is determined by the iris and pupil.

c.—RETINA AND BRAIN.

489. ANGELUCCI. Una nuova teoria sulla visione. *Gaz. med. di Roma*, vol. x., pp. 18 and 19.

490. BURNETT. Are there separate centres for light-, form-, and color-perception ? *Arch. of Med.*, vol. xii., 2, Oct., 1884. Mainly a criticism of Wilbrandt's paper.

491. ENGELMANN. The movements of the retinal cone- and pigment-cells under the influence of light and the nervous system. *Arch. f. d. ges. Phys.*, vol. xxxv., p. 498.

492. RICCÒ. Fenomeno di colorazione soggettiva prodotto dalla lue palpebrale. *Ann. di ottalm.*, vol. xiii., 5.

ANGELUCCI (489) has continued his interesting studies on the reaction of the pigment-epithelium to light (*v.* vol. xi., 3, p. 375, these ARCH.), and after examining into the reaction of the rods, cones, and visual purple, he comes to the following conclusions : Vision is the result of the physical and chemical changes produced by white and colored light in the cells of the retinal epithelium and in the outer segment of the rods and cones. These parts of the retina are the sensitive medium, which is variously irritated by the different kinds of light; the perception of this irritation takes place in the nervous portions of the rods and cones, while the consciousness of what has been seen is an act of the cortical substance of the brain. DANTONE.

ENGELMANN (491) has found that the inner parts of the cornea become shorter under the influence of light and elongate again in the dark. This photo-mechanical reaction of the cones seems to be produced by all parts of the visible spectrum, but it is probable that the more refrangible rays act with greater intensity. When only one eye is illuminated, the cones of the other show the same reaction. If the brain, however, is destroyed, the reaction is limited to the illuminated eye. The cones and pigment can be set in motion also by reflex irritation from distant parts of the body.

RICCÒ (492) has observed in himself the following subjective sensation: When awaking in a bright room, he sees letters held before the eye red for 1–2 seconds, the white paper greenish. Practice enabled him to observe the phenomenon without previous sleep, by closing the eyes, bending the head forward and exposing it for a short time to direct sunlight. The author attributes the phenomenon to the light being made red by passing through the lids filled with blood, the light being perceived as red upon those portions of the retina which are not illuminated (corresponding to the black letters), and in the contrast-color, green, on the parts which are. If the eyes are shaded with the hand or bandaged while exposed to the sunlight, the phenomenon is not perceived.

DANTONE.

d.—COLOR-PERCEPTION.

493. AUGSTEIN. Disturbance of the color sense in neuritis. *Arch. f. Augenhk.*, vol. xiv., 3, p. 347.

494. CHARPENTIER. Rechérches sur la perception différentielle des couleurs. *Arch. d'ophth.*, Dec., 1884.

495. HOCHEGGER. The historical development of the color-

sense. Innsbruck, 1884. Neglects the physiological side completely, and does not give any thing new. Is rather a step backward than forward.

496. HOLMGREN. On the color-sense. Internat. med. Congr. at Copenhagen. *Centralbl. f. prakt. Augenhk.*, p. 333.

497. HILBERT. A peculiar phenomenon of the exhaustion of the nervous visual apparatus and its relation to erythropsia. *Klin. Monatsbl. f. Augenhk.*, 1884.

498. JEFFRIES. Education of the normal color-sense. *Circular of Information of the Bureau of Education.* Washington, 1884, No. 4.

499. LIBBRECHT. Color-blindness. Internat. med. Cong. at Copenhagen. *Centralbl. f. prakt. Augenhk.*, 1884, p. 330.

500. LUSSANA. Sull udizione colorata. *Giorn. internaz. di sci. med.*, vol. vi., 9.

501. REDARD. Color-blindness. Internat. med. Congr. at Copenhagen. *Centralbl. f. prakt. Augenhk.*, 1884, p. 330.

502. VELARDI. Della udizione colorata. *Giorn. internaz. di sci. med.*, vol. vi., 7.

CHARPENTIER (494) examined with his differential photometer (described in the *Arch. d'ophth.*, vol. ii., No. 5, p. 418) the differential sensibility of the eye for colors, one of equal brightness, two of the same degree of saturation, and three of the same "visual intensity." He comes to the following conclusions: The differential sensibility depends upon the intensity of illumination. For the same intensity of illumination it is the greater the less refrangible the color. For all colors as well as for white light the fraction is differentially (additional illumination divided by the illumination of the background) inversely proportioned to the square root of the illumination at the time being. For the same illumination of the back-ground a color is more easily distinguished on a white surface than on one of the same color, and best on a surface of the complementary color. When the degree of saturation is the same, the differential sensibility is equal for all colors. Also when the " visual intensity " is the same.

v. MITTELSTÄDT.

HOLMGREN (496) has found that the spectra of all color-blind persons are shortened in a varying degree. Yellow is not a primary color, being composed of red and green. Red, green, and violet are certainly the primary colors.

HILBERT (497) ascribes erythropsia to irritation of the central nervous system.

LIBBRECHT (499) has examined 8,000 railroad employés and found 2.6 per cent. color-blind. Holmgren's method gave excellent results, while Stilling's plates were less satisfactory.

LUSSANA (500) remembers that as early as 1872 he mentioned two students from Parma in the Piccola biblioteca medica and 1873 in his Fisiologia dei colari who had aural sensations distinctly associated with conceptions of color. High voices produced the sensation of red, low ones of black. A bass voice sounded black, a baritone dark-brown. The low notes of the female voice produced the sensation of brown, in a higher scale reddish-brown, and finally red.

REDARD (501) describes a lantern with three sliding glasses of different color for testing for color-blindness.

VELARDI (502) compiles the cases of colored aural sensations thus far observed and discusses the views of the origin of this peculiar phenomenon.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

BY DR. HORSTMANN.

503. FÖRSTER. The influence of concave glasses and the convergence of the axes on the further development of myopia. *Arch. f. Augenhk.*, vol. xiv., p. 295.

504. HORSTMANN. Contribution to the development of the refractive conditions of the human eye during the first five years of life. *Arch. f. Augenhk.*, vol. xiv., p. 328.

505. HERSING. Examination of the eyes of 2,132 scholars. Appendix No. 1 to the medical report on the elementary schools of Alsace-Lorraine. Strasburg, 1884.

506. FITZGERALD. Influence of errors of refraction in affections of the conjunctiva. *Brit. Med. Jour.*, Nov. 22, 1884, p. 1012.

507. WEISS, L. Contributions to the anatomy of the myopic eye. *Mitth. a. d. ophth. Klin. in Tübingen.* vol. ii., 1, p. 57.

HERSING (505) examined the eyes of 2,132 scholars, and found myopia in only 2–3 per cent. among the country pupils, but 9–14 per cent. among the town pupils. At the age of 10–12 myopia

seems generally to be due to an accommodative spasm ; after that age to changes in the form of the globe.

FITZGERALD (506) calls attention to the fact that frequently the refraction is not correctly determined on account of affections of the conjunctiva lids, cornea, and iris. FITZGERALD.

WEISS (507) publishes an examination of two myopic eyes: one had a myopia of moderate, the other a myopia of high degree. In both the sclera with the thinned choroid penetrated far into the substance of the optic nerve at the nasal edge of the optic foramen. The retina did not extend quite so far, while the pigment-epithelium reached as far as the sclera and choroid in the first case, in which it was well preserved ; in the second it was atrophic. At the temporal edge of the optic foramen the reverse was the case. The sclera and choroid ended here in an obtuse angle, while the pigment-epithelium and outer layers of the retinal were entirely absent in the immediate neighborhood of the papilla. [Important, but not new.—ED.]

VII.—AFFECTIONS OF THE LIDS.

508. ALLPORT, FRANK. On Hotz's entropium-operation. *Amer. Jour. of Ophth.*, vol. i., 6, p. 186.

509. BONO. L'iunesto cutaneo nell' oculistica operativa. *Gaz. de Clin.*, 1884, vol. xx., 6–7.

510. GIRAUD, F. Traitement du l'entropion et du trichiasis par le procédé de Hotz. *Thèse de Paris*, 1884.

511. TERRIER. Rapport sur deux travaux de Messrs. Vieusse et Trousseau touchant la thérapeutique de l'entropion et du trichiasis par les cautérisations au thermocautère. *Soc. du chir.*, Nov. 25, 1884.

512. SAINT MARTIN. Phlegmon de la paupière supérieure determiné par la pénétration d'une corps étranger. *Bull. des quinze vingts*, 1884, No. 2.

513. SAINT MARTIN. Cautérisations ponctuées dans le blepharospasme. *Ibid.*, No. 2, p. 86.

514. SAINT MARTIN. Phlegmon gangréneux de la paupière supérieure de l'œil droit consécutivement à un traumatisme. *Ibid.*, No. 3, p. 146.

515. SAINT MARTIN. Paralyse faciale et gangrène de la paupière supérieure consécutivement à une rougeole. *Ibid.*, No. 3, p. 145.

516. SAINT MARTIN. Gangrène partielle de la paupière inférieure dans le cours d'une scarlatine. *Ibid.*, No. 3, p. 144.

517. GALLENGA. Contribuzione allo studio dei tumori delle palpebre. *Gazz. d. clin.*, vol. xx., p. 35.

ALLPORT (508) calls attention to the advantages of Hotz's operation.

GIRARD (510) recommends the same operation, which he has modified by applying a blepharostat, making the incision nearer the edge of the lid and inserting more sutures; in partial trichiasis he performs it only to a corresponding extent.

V. MITTELSTÄDT.

BONO (509) has transplanted several flaps without a pedicle in a girl aged twenty, who had marked ectropium of the right lower lid, the result of extensive lupus-scars. After first performing tarsoraphy and loosening the cicatricial tissue, the wound, measuring about 12 sq. *cm.* in extent, was covered at both ends with flaps taken from the upper arm, and when after twelve days they had taken hold, the remaining central granulating surface was covered with a third flap. Union took place rapidly, beginning at the centre of the flaps, which retracted considerably and cast off their epidermis. After nine months the lids were separated again. The operation was completely and permanently successful.

DANTONE.

TERRIER (511) reports on the methods of Vieusse and Trousseau of treating entropium; the former draws three lines 1½ *cm.* long with the thermocautery vertically to the margin of the lid, the latter parallel to the margin. The former reports on more than forty, the latter on more than ten cases. Monod operated once according to Trousseau in a case in which Gaillard's method had failed, and saw an entropium converted into an ectropium. Trelat destroys the hair-follicles with the galvano-cautery according to Caron de Villars in partial trichiasis. V. MITTELSTÄDT.

GALLENGA (517) describes a true melanotic sarcoma which he excised from the upper lid of a woman aged sixty-six. The tumor, which sprang from the tarsus and had penetrated the whole thickness of the lid, had attained the size of a hazel-nut, and consisted of a large, highly pigmented nodule embedded in the centre of the lid, and two smaller ones, above and below the other; one of the smaller nodules was only slightly pigmented, the other not at all. DANTONE.

VIII.—DISEASES OF THE LACHRYMAL APPARATUS.

518. KEYSER, P. D. Neoplasm of the lachrymal gland. *Jour. of the Amer. Med. Assoc.*, Oct. 25, 1884.

519. EMRYS-JONES. Lead-styles in treatment of lachrymal obstructions. *Brit. Med. Jour.*, Oct. 4, 1884, p. 652.

KEYSER (518) removed a tumor originating in the lachrymal gland. The microscopic examination showed that it consisted partly of small round cells, partly of the inflamed and infiltrated lachrymal gland. A relapse occurred later, which was also removed and proved to be a round-cell sarcoma.

EMRYS-JONES (519) inserted a lead-style for stricture of the lachrymal duct in a man aged thirty-five. In a fortnight he returned with total necrosis of the cornea, but it is doubtful whether the lead-style had any thing to do with this condition.

FITZGERALD.

IX.—MUSCLES AND NERVES.

520. BJELOW. Determination of the dynamic equilibrium of the muscles. *Wjestnik Ophth.*, July, Oct., Nov., Dec., 1884.

521. EALES. Divergent strabismus. *The Lancet*, 1884, vol. ii., No. 26.

522. RAMPOLDI. Singolarissimo caso di equilibrio motorio oculo-palpebrale. *Ann. di ottalm.*, 1884, vol. xiii., 5.

523. DUJARDIN. Ptosis bilatéral isolé. *Jour. des sci. méd. de Lille*, 1884. No. 16, p. 611.

524. DÉJERINE. Paralysie bilatérale des releveurs de la paupière chez un ataxique. *Prog. méd.*, 1884, No. 43, p. 850.

BJELOW (520) described in 1881 in an appendix to his dissertation (contribution to the knowledge of the conditions under which the dynamic equilibrium is maintained between the internal and external recti muscles of eyes with different degrees of refraction), a method for determining the dynamic equilibrium of the muscles of the eye. He found that equilibrium exists only when the power of abduction is to that adduction as 1:2, no matter whether the eyes are emmetropic or corrected ametropic eyes. The method consists in producing equilibrium by means of abducent prisms, whose power expresses the degree of insufficiency and is determined according to the formulas I (insufficiency of the interni) = $\frac{2\,Ab - Ad}{3}$ and E (insufficiency of the externi) = $\frac{Ad - 2\,Ab}{3}$. The present investigations are intended to strengthen the conclu-

sions arrived at in his dissertation ; the author also compares the different methods and concludes that his is superior to those of Albr. v. Graefe and Alfr. Graefe. Numerous tables are appended.
HIRSCHMANN.

RAMPOLDI (522) describes a peculiar disturbance of motility, probably congenital, which he observed in an otherwise healthy girl four and one-half years old. The action of the lids was jerky, spasmodic, and not synchronous on both eyes, *i. e.*, the upper lid of one eye was raised while that of the other fell. The influence of the will was absent, only in sleep both lids were closed. The right eye was turned outward and could not leave this position ; only when the lid was raised it turned inward a little, but did not reach the median line. The left eye was turned outward when the lid was closed, but the other movements were not so completely nullified as in the right. The pupils reacted promptly, but were widely dilated when the eyes were closed ; when these were opened the pupils contracted, accompanied by oscillations synchronous with the twitchings of the levator palpebræ. The clonic contractions of the muscles of the lids and iris were also observed in sleep, during which the right eye was not completely closed, and appeared more prominent. Refraction and accommodation were normal, as far as this could be determined, also the fundus. The action of atropine and myotics took place more slowly, and lasted a shorter time than in healthy eyes.
DANTONE.

DUJARDIN (523) saw ptosis suddenly develop in both eyes in an otherwise healthy man aged twenty-two, who had been suffering for some time from dizziness. As all the other muscles and the pupils were normal, Dujardin ascribes the affection to a lesion of a centre common to both levators. The application of the constant current and the use of strychnine brought about complete recovery in four months. v. MITTELSTÄDT.

DÉJERINE (524) found the levator palpebrae and its nerve degenerated on both sides in a case of tabes. v. MITTELSTÄDT.

X.—ORBIT AND NEIGHBORING CAVITIES.

525. AUB, J. Two cases of orbital tumors. *Amer. Jour. Ophth.*, 1884, vol. i., 8, p. 243.

526. EATON, F. B. Cellulitis and periostitis of the orbit as sequels of other morbid conditions with cases. *Trans. Oregon State Med. Soc.*, 1884.

527. HUNICKE, W. Case of syphilitic periostitis of the orbit. *Amer. Jour. Ophth.*, July, 1884.

528. FONTAN. Mécanisme de l'emphysème orbito-palpébral (suite et fin). *Rec. d'ophth.*, 1884, No. 10, p. 594.

529. CHAUVEL. Rapport sur un cas d'exostose éburnée du frontal, remplissant la cavité orbitaire. Ablation avec la gouge et le mallet. *Rev. de chir.*, August, 1884, p. 685.

530. RAMPOLDI. Esoftalmo intermittente da enfisema dell' orbita. *Ann. di ottalm.*, 1884, vol. xiii., 3–4.

531. LLOYD. Proptosis from thrombosis of the cavernous sinuses. *Ophth. Rev.*, 1884, p. 906.

532. FRANK, F. Topographie comparée des systèmes nerveux oculopupillaire et cardiaque accélérateur; application au goître exophthalmique. *Compt. rend. off. des séances de la soc. de biol.* S. du Mai 3, 1884.

533. GALUP, J. Quelques considérations sur le traitement du goître exopthalmique par l'iode et ses composés. *Thèse de Paris*, 1884.

534. GRUEL. De l'hydrothérapie dans le goître exophthalmique. *Progr. méd.*, 1884, No. 20, p. 404.

535. DIANOUX. Des troubles visuels dans le goître exophthalmique. *Ann. d'ocul.*, vol. xcii., p. 168.

EATON (526) relates two cases of cellulitis and periostitis of the orbit in patients convalescent from typhoid fever; in one it is probable, however, that a carious tooth may have been a factor. Another case was probably due to syphilis. BURNETT.

In HUNICKE'S (527) there was exophthalmus, hardness of the eyeball and diplopia. Under antisyphilitic treatment the patient recovered. BURNETT.

FONTAN (528) discusses orbital emphysema and mentions the case of a convict, who, in order to remain in the hospital, produced emphysema of the orbit by inflicting a slight injury with a pin at the root of a molar tooth and then blowing in air from the mouth. MARCKWORT.

RAMPOLDI (530) mentions an emphysema of the orbit which had developed without an injury from a chronic coryza. The affection developed during sleep, the lids beginning to swell, and the left eye becoming slightly prominent and deviating. These symptoms disappeared after a few days, but the exophthalmus and diplopia returned very often when the patient sneezed or

coughed, and could be produced at will by compressing the air when the mouth and nose were closed; distinct crepitation was then audible. The patient after a while always placed his hand on the eye when about to make a forcible expiration, to prevent the exophthalmus or at least press back the eyeball into position. The same condition still existed a year later. DANTONE.

LLOYD (531) observed the case of a boy who had been beaten about the head by a school-fellow, and had had epistaxis for three days when he was admitted to the hospital. A free discharge of watery fluid from the ear and a dirty-colored liquid from the nose followed, his strength failed, he became unconscious and finally died. The post mortem showed a fracture of the base of the brain and aneurisms of the internal carotid and basilar arteries, which had caused the exophthalmus. FITZGERALD.

FRANK (532) points to the common origin of the fibres supplying the muscles of the eye and the accelerators of the heart, which coming from the cervical part of the spinal cord, unite in the first pectoral ganglion. As the vaso-motor nerves of the head, the upper extremities, the lung, etc., take the same course, the large number of symptoms in affections of the cord or ganglion, as observed in Graves' disease, is easily comprehended.

V. MITTELSTÄDT.

GALUP (533) recommends one grm. of iodide of potash against Graves' disease, and in marked vascular and cardiac symptoms bromide of potash, which advice he bases on the observation of three cases.

GRUEL (534) recommends hydrotherapeutics against Graves' disease as soon as the first symptoms appear. V. MITTELSTÄDT.

XI.—AFFECTIONS OF THE CONJUNCTIVA, CORNEA, AND SCLERA.

536. GARRIGUES, H. J. Prevention of ophthalmia neonatorum. *Amer. Jour. Med. Sci.*, Oct., 1884.

537. AUBERT. Deux observations d'ophthalmie blennorrhagique. *Lyon méd.*, Oct. 5, 1884.

538. DERBY, R. H. Notes on contagious ophthalmia in some of the asylums of New York City. *Med. Rec.*, Nov. 1, 1884.

539. KOLIPINSKI, L. Treatment of scrofulous conjunctivitis with nasal catarrh. *Med. News*, Sept. 27, 1884.

540. AWSITIDISKY. Treatment of ocular affections. *Russkaja med.*, 1884, No. 19.

541. REICH. Note on sublimate in trachoma. *Wjestnik Ophth.*, 1884, vol. i., 6, p. 510.

542. IWANOW, S. D. Sublimate in diseases of the eye. *Russkaja med.*, 1884, No. 42.

543. PERNICE. Il sublimato corrosivo in oculistico. *Gazz. d'ospit.*, vol. v., p. 83, 1884.

544. SCHNELLER. Treatment of trachoma by excision of the fornix. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 131.

545. ANDREWS, J. A. Trachoma and the etiology of jequirity ophthalmia. *Arch. of Med.*, 3, June, 1884. *N. Y. Med. Jour.*, vol. xl., 4, p. 104.

546. RAMPOLDI e BOGGI. Sul jequirity. *Ann. universali di medicina*, Aug., 1884.

547. LUNDY, CH. Jequirity and some of its ill effects. *Amer. Jour. of Ophth.*, vol. i., 11, p. 210.

548. WARLOMONT. Jequirity. *Ann. d'ocul.*, vol. xcii., p. 188.

549. SCHULIN, CH. Some experiments with jequirity. *Med. Rec.*, Nov. 23, 1884.

550. TROITZKY, S. Jequirity in hospital practice. *Russkaja med.*, 1884, No. 30.

551. FICANO. Del jequirity nella cura del tracoma. Palermo, 1884.

552. GOSSETTI. Il jequirity nella terapia oculare. *Riv. Ven. di sci. med.*, No. 4, 1884.

553. GOTTI. Il jequirity nella clinica oculistica di Bologna. *Riv. clin.*, vol. xxiii., Sept. 9, 1884.

554. COCCI. Sull' influenca della risipola sul tracoma. *Gazz. d'ospit.*, vol. v., p. 81, Oct., 1884.

555. AWSITIDISKY. Two cases of conjunctival trachoma cured by erysipelas. *Russkaja med.*, 1884, No. 47.

556. PARISOTTI, O. Contribution à l'étude des tumeurs benignes de la conjonctive. *Rec. d'ophth.*, 1884, No. 10, p. 575.

557. FICANO. Un caso di dermoide o neoplaso della congiuntiva. *Ann. d. ottalm.*, vol. xiii., 6, p. 568.

558. SCHLEICH. Xerosis of the conjunctiva. *Mittheil. aus d. ophth. Klin. zu Tübingen*, 1884, vol. ii., 1.

559. SCHULZ, R. Contribution to the knowledge of xerosis of the conjunctiva and infantile corneal necrosis. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 61.

Three hundred and fifty-one children delivered in a year at the New York Maternity Hospital were treated, as GARRIGUES (536) reports, according to Credé's method without a single occurrence of ophthalmia; one case only, in which the application was neglected, had inflammation of the eye sresulting in corneal opacity.

AUBERT (537) reports two cases of mild blennorrhœa in men with chronic conjunctivitis, who a short time previously had acquired gonorrhœa. In both gonococci were found.

V. MITTELSTÄDT.

DERBY (538) found that in an asylum for boys 29 per cent. had contagious ophthalmia; in that for girls, 19 per cent. In another large institution 28.5 per cent. of the seniors and 36 per cent. of the juvenile department for boys were affected. In the department for girls 30 per cent. of the seniors were affected. The communicability of the affection was illustrated by the fact that when a group of children were presented in succession, they were habitually those which occupied adjacent seats in the class-room. [The word "contagious" must have been used in a very broad sense; I have never seen such a percentage of contagious ophthalmia in any asylum of New York City.—H. K.] BURNETT.

KOLIPINSKI (539) reports three cases which he treated by causing the patients to snuff up the nostrils a solution of fifteen grains of the potassium chlorate to the fluid-ounce of water. When the children were too young to snuff up the solution, it was dropped into the nostrils with a pipette. All made excellent recoveries, though the local treatment of the eye was suspended. BURNETT.

AWSITIDISKY (540) observed symptoms of irritation and even formation of vesicles after the long-continued use of a two-per-cent. solution of boracic acid for cleansing the conjunctival sac in trachoma. The trachoma itself was not affected at all by the boracic acid. He therefore substituted in acute trachoma a solution of sublimate, 1 grm. to the pound [about 1 : 500, or gr. i. : ℥ i., which seems rather strong.—H. K.], with which he cleansed the conjunctival sac five to six times daily, and saw marked improvement. He also recommends this solution in phlyctenular conjunctivitis and keratitis. HIRSCHMANN.

REICH (541) recommends solutions of sublimate, weak ones for disinfection in contagious affections of the conjunctiva, especially

in the army; stronger ones for the purpose of irritation, to be washed off immediately afterward (like in cauterizations with nitrate of silver), in concentration of 1–3 gr. to the ℥ in follicular trachoma. In the latter affection Reich saw large granules disappear with comparative rapidity, while the surface of the mucous membrane, though diffusely infiltrated, became smooth.

HIRSCHMANN.

IWANOW (542) did not observe any marked benefit follow the application of instillations of sublimate (1–2 grms.: lb. 1), either in simple conjunctivitis or in trachoma. HIRSCHMANN.

PERNICE (543) recommends sublimate in corneal ulcers and purulent conjunctivitis. The author has determined by experiments that pus from lachrymal abscesses which has been for a while in a sublimate solution of $\frac{1}{1000}$, can be vaccinated into the cornea of rabbits without the slightest result. If the pus is not disinfected, infiltrations, deep ulcers, and even suppuration of the whole eye are the consequence.

SCHNELLER (544) excised the whole fornix in twenty-six cases of trachoma. He found that this greatly shortened the clinical treatment; the linear scar had no evil effect, the corneal affections healed very rapidly, and relapses of the trachoma and the pannus dependent upon it did not occur. Schneller believes that excision of the fornix is of advantage also in other affections of the cornea, accompanied by swelling of this fold.

As the result of his experience, ANDREWS (545) thinks it best to begin with a weak—say 2-per-cent.—solution. The berries should be husked, crushed, and macerated for about six hours in cold distilled water, and then filtered; thirty hours should elapse between each application. Preëxisting purulency is a contraindication to the employment of the remedy. He has used it in this may in one hundred and forty cases of diseases of the conjunctiva and cornea with no untoward result. BURNETT.

RAMPOLDI and BOGGI (546), although not too enthusiastic over the new remedy, consider the application of jequirity an advance in therapeutics. In seventeen cases observed the effect was quite marked, especially on the pannus. The authors are not satisfied with the efforts made to connect the action of the remedy with the microscopic appearance of the infusion prepared and treated in different ways, and they are inclined to assume a special chemical principle. DANTONE.

LUNDY (547) relates some cases in which the result of the jequirity treatment had not been happy. BURNETT

The *Ann. d'ocul.* (548) contains two answers to Wecker's last paper on jequirity (*Ann. d'ocul.*, vol. xcii., p. 5), with remarks by WARLOMONT. PARISOTTI makes a few remarks on determining facts.

SCHULIN (549) makes a careful selection of his cases. He never uses the remedy in children nor in fresh cases of granulations with hyperæmia. Nor has he proposed it in the dry, yellow, sago-grain granulations, and he never dares to treat granulations during one of the attacks of inflammation so common in the disease. He uses a 2-per-cent. solution applied three times in nine hours. BURNETT.

TROITZKY (550) has employed the jequirity-treatment in fifty-one cases, among them one of not inflammatory trachoma, and seven with pannus. Complete recovery (after 3–7 months of continuous, repeated treatment) was observed in sixteen cases, marked improvement in nineteen, none in eleven, and in four not even jequirity-ophthalmia. The pannus was much improved in three cases, somewhat in two, and remained unchanged in two. Troitzky earnestly recommends jequirity in every obstinate case of trachoma. HIRSCHMANN.

FICANO (551), GOSSETTI (552), and GOTTI (553) are very much in favor of jequirity, and praise especially its effect on pannus. DANTONE.

COCCI (554) reports on a patient with trachoma who became affected with erysipelas of the face during treatment. When the eyes were examined after recovery the granulations had disappeared, the pannus had cleared up almost entirely, and a deep marginal ulcer of the cornea had filled up. The author ventilates the question of inoculating erysipelas for therapeutical purposes. DANTONE.

PARISSOTTI (556) publishes a paper in which he tries to prove that the neoplasms of the conjunctiva usually designated as polypi should not bear this name, but that of papillomas. MARCKWORT.

FICANO (557) observed in a girl aged six a dermoid of the conjunctiva, situated in the upper outer quadrant of the globe, one *cm.* from the corneal margin on a conjunctival elevation extending to the fornix. The grayish tumor was the size of a lentil, and bore about twelve fine hairs ½ *cm.* long, arranged in a horizontal line, which turned upward and lay close against the globe. It was covered by the upper lid, and did not give rise to any annoy-

ance. He thinks the little tumor was congenital ; he had also seen a similar one on the conjunctiva of a dog. DANTONE.

SCHLEICH (558) examined three cases of xerosis of the conjunctiva, two with hemeralopia, and one without any functional disturbance, for the bacilli discovered by Kuschbert and Neisser, and found them. He saw similar bacilli, however, in almost every case of slight chronic conjunctivitis. Vaccinations with cultivated bacilli produced no effects on rabbits.

SCHULZ (559) reports a case of xerosis of the conjunctiva with suppuration of the cornea, which terminated fatally. He also believes the disease to be of parasitic origin.

560. PURTSCHER, O. Un caso di cheratite punctata albescens. *Boll.*, vol. vi., 2, p. 137.

561. SCHADEK, K. Cases of corneal affections, the result of acquired syphilis. *Wjestnik Ophth.*, vol. i., 3, p. 362.

562. FERRET. Note sur la kératite d'Hutchinson. *Bull. de la clin. nat. ophth. de l'hosp. des quinze-vingts*, vol. ii., 3, p. 139.

563. LEPLAT. De l'origine syphilitique de la kératite parenchymateuse. *Ann d'ocul.*, vol. xcii., p. 143.

564. LANDESBERG, M. A. New method of treatment in deep ulcers of the cornea. *Med. and Surg. Rep.*, 1884, vol. li, No. 18.

565. WIDMARK, J. Bacteriologiska studier öfver dacryocystitis och ulcus serpens corneæ. *Nord. Med. Ark.*, 1884, vol. xvi., No. 25.

566. NAGEL. A pathological phenomenon of circulation in the cornea. *Mitth. a. d. ophth. Klin. in Tübingen*, 1884, vol. ii., 1, p. 158.

567. BOUCHER. Contribution à l'étude des corps étrangers de la cornée. *Rec. d'ophth.*, 1884, No. 12, p. 711.

568. ANDREW. Use of the cautery in eye-practice. *Ophth. Rev.*, Nov., 1884.

569. PANAS. L'irido-sclérotomie. *Arch. d'ophth.*, vol. iv., 6, p. 481.

570. SCHIESS-GEMUSEUS. Congenital staphyloma of the cornea. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 195.

571. RAMPOLDI. Contribuzione alla storia clinica della cheratocono. *Ann. di ottalm.*, 1884, vol. xiii., 3–4.

572. FALCHI. Fibroma della cornea. Atti della *R. Accad. di med. di Torino*, Torino, 1884.

573. JEGOROW. Case of epibulbar melanotic sarcoma of the eye. *Wjestnik Ophth.*, 1884, No. 4.

574. ALT, A. On the microscopical changes found in a tattooed cornea. *Amer. Jour. Ophth.*, vol. i., 1, p. 8.

In the keratitis described by PURTSCHER (560) and considered very rare there were about fifteen white infiltrations the size of a pinhead, with clear spaces between them in the parenchyma of the lower half of the cornea. The author ascribes the disease to syphilis, on account of the participation of the uvea and on account of the prompt effect of anti-syphilitic treatment (first inunction, then iodide of potash), which caused the exudations to disappear after the lapse of fifty days. No other symptoms of syphilis were detected in the patient. DANTONE.

SCHADEK (561) observed, nine months after the primary infection, periostitis, papulous eruption, laryngeal affection, recurrent, plastic syphilitic iritis, a marginal ulcer resembling a phlyctenula, finally, intense parenchymatous diffuse keratitis in both eyes, with a few superficial small infiltrations in the left. Recovery, after energetic inunction and the internal use of iodide of potash, in two months ; only a few synechiæ remained. HIRSCHMANN.

Without wishing to deny the great variety of causes of parenchymatous keratitis, FERRET ascribes the form accompanied by the well-known deformities of the teeth to syphilis in every case. The disease of the parents is always of recent date.

V. MITTELSTÄDT.

LEPLAT (563) declares himself in favor of Hutchinson's theory as to the etiology of parenchymatous keratitis, and bases his belief on the numerous observations made at Fuchs's clinic. Arlt's classification of (1) lymphatic (scrofulous) keratitis, and (2) keratitis due to hereditary syphilis (Arlt, Klin.-Darst. d. Krankh. d. A., pp. 111 and 116), he considers rather artificial than natural. The syphilitic nature was certain in eighteen of the twenty-eight cases observed by Leplat, while in two cases only, there were no indications of syphilis. The paper contains many interesting details, especially as to the simultaneous occurrence of parenchymatous keratitis with other syphilitic affections. He also reports a case of parenchymatous keratitis with hypopyon. MARCKWORT.

WIDMARK (565) has made inoculations with bacteria bred pure from dacryocystitis and then used them up to the 21st generation. He obtained positive results in all cases and could demonstrate the infiltration with bacteria in the cornea. He, then, again culti-

vated the bacteria taken from the corneal ulcer on the rabbit's eye, and inoculated them into another cornea with positive results. The bacteria when inoculated into the cornea produced an infiltration, and five days later caseous foci were found. The bacteria bred from these again produced positive results when inoculated into the cornea of a rabbit.

NAGEL (566) found that the phenomenon of circulation in the cornea previously observed by him, as well as by Rampoldi and Denti, namely, the transitory appearance of blood- and lymph-corpuscles in the deeper layers of the cornea, is due to a slight hyphæma or hypopyon in which coagulation has not taken place. The corpuscles are concealed behind the scleral margin when the head is carried erect, but appear in shape of stripes or spots on Descemet's membrane, when the head is bent forward.

BOUCHER (567) publishes a paper in which he tries to prove from the clinical history of five cases that the prickles of the chestnut, the cactus, etc., when they enter the cornea, do not produce infection.

PANAS (569) performed the following operation, which he has frequently done since, and has named iridosclerotomy, in a case of a large corneal ulcer with a hernia of Descemet's membrane, no anterior chamber and greatly increased tension, in which iridectomy was impossible : A cataract knife was passed in from below and outward 1 *mm.* from the corneal margin. As soon as the point appeared in the anterior chamber, the knife was pushed along behind the iris, until it appeared at the symmetrically situated point. The iris and sclera were then cut, except a bridge of the latter 2–3 *mm.* wide ; in withdrawing the knife the edge was turned forward in order to cut the peripheral parts of the iris from behind. The result was very satisfactory. Panas recommends the operation in cicatrical staphyloma, occlusion of the pupil, loss of the anterior chamber and increased tension, etc., and reports three cases more. In two of them the result was not very satisfactory. The operation may also be done as a preliminary to iridectomy. Distension of the posterior chamber is a necessary condition for iridosclerotomy, which, however, cannot always be demonstrated with certainty, as the third case shows. Nevertheless, Panas has no fear of injuring the lens.

v. MITTELSTÄDT.

In the five cases of keratoconus observed by RAMPOLDI (571) among eight thousand eye-patients the apex of the cornea was

never clear. In four of them marked improvement was obtained by long-continued use of atropine, and a compressive bandage, general treatment, and nourishing diet—the symptoms of irritation disappearing, and the cornea becoming flatter. Eserine rather made the condition worse. DANTONE.

A small corneal tumor extirpated by FALCHI (572) at the Turin clinic was situated on the lower half of the cornea. It was smooth, white, tinged with red from the blood-vessels, 6–7 *mm.* wide and 3–4 *mm.* high. The corneal tissue surrounding it was somewhat opaque at the line of contact and ectatic, otherwise normal. Under the microscope the tumor proved to be a pure fibroma springing from the connective tissue of the cornea. The epithelium covering the tumor was normal; in the outer layers only cells were found in various stages of mucous degeneration. The fibres of the fibroma were parallel to the epithelium in the outer layers, in the lower ones very irregularly arranged; a few blood-vessels traversed the tumor. The neoplasm had developed in the course of nine years; after it had been removed, a broad, solid scar formed on the cornea, which had not changed when seen five years later. DANTONE.

JEGOROW (573) reports a case of epibulbar melanotic sarcoma of the eye. The tumor which was almost the size of a fist, was situated at the lower inner margin of the cornea. Thus far (three years later) no relapse. HIRSCHMANN.

575. CASPODI. Massage in ophthalmology. *Wiener med. Wochenschr.*, 1884, No. 29.

576. SNELL, S. Wounds of the sclerotic, with remarks on their treatment by suture. *Ophth. Rev.*, 1884, vol. iii., 36, p. 300.

577. JOYE, J. A. The treatment of wounds of the sclerotic through the conjunctiva. *Amer. Jour. Ophth.*, 1884, vol. i., 10, p. 216.

578. SAINT-MARTIN. Gomme de la sclérotic. *Bull. des quinze-vingts*, 1884, No. 1, p. 34.

JOYE (577) reports two cases in which Schöler's method of closing the scleral wound with the conjunctiva was successfully performed. In both some vision was preserved. BURNETT.

SAINT-MARTIN (578) saw a gumma of the sclera develop under the insertion of the external rectus, four years after the infection, which had never been treated. It soon disappeared under the influence of specific remedies. v. MITTELSTÄDT.

579. KOLLER, K. The application of cocaine for producing anæsthesia of the eye. *Wiener med. Wochenschr.*, 1884, Nos. 43 and 44.

580. KÖNIGSTEIN. Muriate of cocaine and its application in ophthalmology. *Allg. med. Centralztg.*, vol. xliii., No. 89. *Wiener med. Presse*, 1884, Nos. 42 and 43.

581. HOWE, L. Cocaine as a local anæsthetic for the eye. *Fortschritte d. Med.*, 1884, No. 22.

582. MERCK, E. Cocaine and its salts. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 465.

583. BASS. Cocaine as a mydriatic. *Ibid.*, p. 481.

584. HIRSCHBERG, J. Cocaine in ophthalmology. *Centralbl. f. prakt. Augenhk.*, 1884, p. 345.

585. HIRSCHBERG, J. The surgical anæsthesia in operations on the eye. *Berl. klin. Wochenschr.*, 1884, Nos. 50 and 51.

586. HORSTMANN, C. On muriate of cocaine. *Deutsch med., Wochenschr.*, 1884, No. 49.

587. HÖLTZKE, H. The physiological action of cocaine on the eye. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 457.

588. WEBER, A. The local application of cocaine to the eye. *Ibid.*, 443.

589. REICHENHEIM, M. Contribution to the effect of cocaine upon the eye. *Ibid.*, p. 462.

590. SCHENKL. Cocaine, a local anæsthetic for the eye. *Prager med. Wochenschr.*, 1884, No. 45.

591. PURTSCHER, O. The anæsthetic action of cocaine upon the eye. *Centralbl. f. prakt. Augenhk.*, 1884, p. 372.

592. NIEDEN. On cocaine in galvano-cauterization of the eye. *Ibid.*, p. 374.

593. ZIEMINSKY, B. Experimental and clinical contributions to the question of the application of cocaine in ophthalmology. Dorpat, 1884, Schnackenburg.

594. KERNER, J. Muriate of Cocaine in ophthalmic practice. *Wjestnik Ophth.*, vol. i., 6, p. 531.

595. ZACHARYEWITSCH. The question of the local action of cocaine on the eye. *Wratsch*, 1884, No. 49.

596. KAZAUROW, J. N. The local action of cocaine on the eye. *Wratsch*, 1884, No. 43.

597. KAZAUROW, J. N. A few words more on cocaine in ophthalmology. *Wratsch*, 1884, No. 45.

598. NOYES, H. D. Cocaine. *Med. Record*, Oct. 11, 1884.

599. AGNEW, C. R., MOORE, W. O., MINOR. *Med. Rec.*, Oct. 11, 1884.

600. KNAPP, H. Hydrochlorate of cocaine. *Med. Rec.*, 1884, No. 17, p. 461.

601. BULL, ST. The hydrochlorate of cocaine as a local anæsthetic in ophthalmic surgery. *N. Y. Med. Jour.*, vol. xl., 22, p. 609.

602. ALT, A. Clinical experiences with the muriate of cocaine. *Amer. Jour. Ophth.*, vol. i., 8, p. 225.

603. AYRES, S. C. A clinical report on some uses of muriate of cocaine in ophthalmic surgery. *Amer. Jour. Ophth.*, vol. i., 8, p. 238.

604. GREEN, J. Notes on some of the physiological effects and practical applications of cocaine hydrochlorate. *Ibid.*, p. 231.

605. HUNICKE, W. Experiences with hydrochlorate of cocaine. *Ibid.*, vol. i., 8, p. 229.

606. CRAWFORD. Note on the value of hydrochlorate of cocaine in ophthalmic surgery. *The Lancet*, 1884, vol. ii., No. 23.

607. HARTRIDGE, G. The action of hydrochlorate of cocaine on the eye. *Med. Times and Gaz.*, 1884, No. 1705.

608. MURELL, W. Cocaine ; the new local anæsthetic. *London Med. Rec.*, 1884, No. 114, p. 516.

609. MEYER, E. L'anesthésie locale de l'œil par la cocaine. *Rev. génér. d'ophth.*, 1884, No. 10, p. 433.

610. PANAS. Emploi du chlorhydrate de cocaine. *Bull. de l'acad. de méd.*, 1884, No. 47.

611. VULPIAN. Action anesthésique du chlorhydrate de cocaine. *Gaz. hebd.*, 1884, No. 47, p. 770.

612. LANDOLT. La cocaine. *Arch. d'ophth.*, 1884, vol. iv., No. 6, p. 535.

613. BOBONE. La cocaine en ophthalmologie. *Ann. d'ocul.*, vol. xcii., p. 228.

614. GALEZOWSKI. De la cocaine et de son action anesthésique sur l'œil. *Rec. d'ophth.*, 1884, No. 12, p. 703.

615. FANO. Anesthésie locale de l'œil. *Jour. d'ocul.*, Dec., 1884.

616. ARMAIGNAC. De la cocaine et principalement de son emploi en chirurgie oculaire pour produire l'anesthésie locale de la cornée et de la conjonctive. *Rev. clin. d'ocul.*, Nov., 1884.

617. DE MAGNI and DENTI. La cocaine nella chirurgia oculare. *Gazz. d'ospit.*, 1884, vol. v., pp. 98–102.

618. GRASELLI. La cocaine nella terapia oculare. *Gazz. med. Ital. Lomb.*, 1884, No. 49.

619. PEER D'HOUY. La cocaina in oculistica. *Ibid.*, No. 49.

The application of cocaine marks a new era in ophthalmology. The first notice of it was given by Brettauer, Sept. 14, 1884, at the ophthalmological congress at Heidelberg. He reported that C. Koller, in Vienna, had observed a transitory but complete anæsthesia of the conjunctiva and cornea after instillation of a 2-per-cent. solution of the drug. Muriate of cocaine is an alkaloid prepared from the leaves of erythroxylon coca (Lamarck), a plant indigenous to South America, especially Peru and Bolivia. Niemann, a pupil of Wöhler, was the first who prepared it in 1859. Its crystals belong to the monoclinic system, they melt at 98° C., are easily soluble in alcohol and ether, but only in 704 parts of water at 12° C.; its salts however readily dissolve in water. In 1862 Schroff made the the first experiments with it. After doses of 0.05 grm. per os, he observed in rabbits variations of the pulse and respiration, transitory mydriasis and anæsthesia of the mucous membrane of the tongue. When the same dose was injected subcutaneously the animal died under epileptiform convulsions and with marked mydriasis. Latterly Sigmund Freud again examined the drug. He found that a solution of muriate of cocaine produced transient anæsthesia of the mucous membranes. Incited by this KOLLER (579) was induced to test its influence on the conjunctiva and cornea. He obtained the following results: if a few drops of an aqueous solution of muriate of cocaine are dropped upon the eye of a rabbit, guinea-pig, or dog, complete anæsthesia of the conjunctiva and cornea results in ½–1 minute. If, however, the cornea is cut through, the animals manifest great pain the moment the aqueous escapes and the iris prolapses. The inflamed cornea also can be rendered entirely insensible with cocaine. The total anæsthesia lasts about 10 minutes when a 2-per-cent. solution is instilled. If a few drops of a 2-per-cent. solution are put into the

human conjunctival sac, a slight burning sensation is felt, which entirely disappears after ½–1 minute, and is followed by an indefinable feeling of dryness. The palpebral fissure seems larger; the cornea and conjunctiva are entirely insensible to touch. This total anæsthesia lasts about 7–10 minutes, and then after a longer stage of reduced sensibility the normal condition is reëstablished. About 15–20 minutes after instillation the pupil begins to dilate. The dilatation, which however is never a maximum one, is greatest the first hour, then gradually disappears in a few hours. A slight paresis of accommodation accompanies and disappears with the mydriasis. There is also marked ischæmia of the conjunctiva, especially that of the lids. The anæsthetic action can be prolonged by repeated instillations, and is especially noticeable in those parts which have been directly and for a longer space of time in contact with the solution. Koller thinks that a 5-per-cent. solution instilled every 5 minutes for about half an hour, also reduces the sensibility of the deeper parts, the sensibility of the globe to greater pressure being markedly reduced.

Königstein (580) also experimented with cocaine and obtained about the same results as Koller. He used a 1-per-cent. solution and observed the well-known effects, insensibility of the conjunctiva and cornea, anæmia of the former, enlargement of the palpebral fissure, protrusion of the globe, and dilatation of the pupil. These effects are not so marked with stronger solutions (10-per-cent.), as the drug is then not so easily soluble, and it irritates if hydrochloric acid is added. Königstein also performed tenotomies and iridectomies without causing pain, as in the latter operation he instilled cocaine once more after the incision. He also reports that he enucleated an eye of an unfettered and not narcotized dog, after having injected a 1-per-cent. solution into Tenon's capsule, without any manifestation of pain on the part of the animal. He used the remedy for relieving pain in the phlyctenular affections, combustion of the cornea, cyclitis and herpes zoster, and for contracting the blood-vessels in iritis—the drug acts not only on the peripheral sensitive terminations of the nerves, but probably also upon the sympathetic nerve.

Lucien Howe's (581) series of experiments confirmed the anæsthetic action; he found that 2 drops of a 0.2 per-cent. solution produced a perceptible mydriasis, but twice as large a dose was required to affect the sensibility. In stronger doses the anæsthesia of the cornea and conjunctiva is always noticed before the mydriasis. A

2-per-cent. solution is best for producing total anæsthesia ; stronger ones are not much more effective. The maximum effect is reached in about 15 minutes, and then gradually subsides in the course of 30–40 minutes. At first only the conjunctiva and cornea are affected, afterwards also the iris, but never so completely as the former parts, not even when the aqueous is removed with a syringe and replaced with a 2-per-cent. solution of cocaine.

HIRSCHBERG (585) has used cocaine with good results in almost all operations on the eye, especially in a large number of cataract-extractions. He believes that local narcosis with cocaine will replace general narcosis in most operative procedures, at least in adults.

HÖLTZKE (587), who dissolved cocaine in a sublimate solution of 1:5,000, observed the well-known effects of the drug after instilling a 5-per-cent. solution, but did not notice any influence on the accommodation. He believes that it irritates the sympathetic nerve.

A. WEBER (588) and others call attention to a perceptible reduction of the corneal and scleral tension after instillation of the remedy. All these observations indicate that cocaine will be extensively applied, especially in ophthalmology. Koller (*l. c.*) recommends it as a narcotic in painful ocular affections, especially those of the cornea and conjunctiva associated with pain and photophobia, and in iritis. It is most useful, however, as a narcotic in operations on the eye, especially in removing foreign bodies from the cornea, tattooing corneal opacities, in pterygium operations, and in cauterizing corneal ulcers. The corneal or scleral section in iridectomies and cataract-extractions was absolutely painless, while in the succeeding acts of the operations the pain was much reduced.

KNAPP, HORSTMANN, and REICHENHEIM (589) found cocaine useful in treating strictures of the lachrymal duct. The patient feels no pain until the knife or probe has passed the stricture. All observers are united in recognizing the usefulness of cocaine in operations of the conjunctiva of the globe and lids, and on the cornea. HIRSCHBERG (*l. c.*), DOR, and others recommend it also for enucleations, as they found that the pain was greatly diminished.

Cocaine is of the greatest value in treating corneal ulcers with galvano-cautery, as the total anæsthesia of the cornea permits the destruction of even the minutest traces of disease with the electric loop. NIEDEN (592) first called attention to this. He could

safely touch the floor of an ulcer and control the action of the glowing point to such an extent as to limit its action to single layers of the cornea.

In operating for squint the incision of the conjunctiva is painless, but the seizing, hooking, and cutting of the tendon was accompanied by pain, according to the observations of KNAPP (*l. c.*), HORSTMANN (*l. c.* 586) and others.

KAZAUROW (596, 597) made experiments on the local action of cocaine on the eye. He used a vaseline-salve containing 5 per cent. of cocaine and afterwards aqueous solutions of 5–10 per cent. He found that the sensibility of the conjunctiva and cornea is much reduced; that the pupil dilates, first below; that with stronger (10 per cent.) solutions the near point recedes from the eye; that V is not affected, and that the palpebral fissure is enlarged. He also observed pallor of the conjunctiva and less hemorrhage after using the solution (not the salve). Operations (removal of foreign bodies, extractions) are almost painless. Even in an enucleation, performed after instilling cocaine, the pain was very slight.

HIRSCHMANN.

KNAPP (600) injected a 4-per-cent. solution into the orbital tissue, and could then enucleate an eyeball for a melano-sarcoma of the choroid with scarcely any pain. In one case, after an injection of a 4-per-cent. solution, and in another, after injection of a 3-per-cent. solution, he observed peculiar symptoms of collapse, so that he advises caution in injecting it subcutaneously (0.06–0.12 grm.).

KNAPP'S (600) experiments show that a 2–4-per-cent. solution of cocaine reduces the sensibility of the eye, produces moderate mydriasis, limits the accommodation to a slight extent, and causes ischæmia of the conjunctiva. He never observed that it produced pain or any disturbances. He also tested the effect of the remedy on the mucous membrane of the ear, mouth, nose, trachea, larynx, urethra and rectum, and noted in all abolition of sensibility.

E. MEYER (609) confirms the results obtained with cocaine, Among other physiological effects he also found a reduction of the intraocular pressure. He recommends it in operations, for instance in excising chalazia, by dropping it into the wound, making the remainder of the operation, scraping out with a curette, painless. At present he is using it in a salve against the photophobia accompanying some kind of corneal affections.

V. MITTELSTÄDT.

PANAS (610) confirms the diminished effect of cocaine on an inflamed eye. In tenotomy only the seizure of the tendon with the hook is painful. Dujardin-Beaumetz calls attention to the use of cocaine in laryngology, in affections of the stomach, and in opium-eaters. v. MITTELSTÄDT.

VULPIAN (611) observed marked exophthalmus, enlargement of the palpebral fissure, mydriasis, anæsthesia of the cornea, and reduced sensibility of the extremities in a dog under the influence of curare and in one not thus affected after injecting cocaine into the veins. A peculiar motor disturbance seems to be due to a kind of drunkenness. The secretions were not affected, with the exception of an increased discharge of saliva from the submaxillary gland. v. MITTELSTÄDT.

LANDOLT (612) also observed the well-known effects of cocaine. He used it also in probing the lachrymal ducts, less for subcutaneous injection, when only one patient acknowledged insensibility at the point of introduction. The iris and deeper layers of the cornea were not affected. v. MITTELSTÄDT.

BOBONE (613) has mainly prepared a compilation of the numerous papers which have appeared on the action of cocaine on the eye from Sept.–Dec., 1884. He adds the results of his own experiments, of which those on points still under discussion are of interest. The anæsthetic effect of cocaine, when caustics were used, varied in different patients, in one there was no effect whatever. General narcosis was not resorted to in removing the whole staphylomatous section of the eye of a child aged eleven, cocaine being instilled before and during the operation. The boy did not cry and scream. Whether cocaine also effects the deeper parts of the eye is doubtful.

GALEZOWSKI (614) found that the action of cocaine is rapid in men in middle life, but soon disappears, while in old men it is slower but lasts longer. Women stand between the two in this respect.

ARMAIGNAC (616) also publishes an article on cocaine. That part of it is especially interesting which discusses the communications which appeared before that of Koller. Gaedcke (1855), Percy (1857), and Niemann (1859), all claim to have been the first to prepare pure cocaine. Armaignac differs from others by maintaining that cocaine sensibly diminishes the tension of the eye. MARCKWORT.

DE MAGNI and DENTI (617) have made numerous experiments

with cocaine on the eyes of animals, as well as on healthy and diseased human eyes. Among animals the eye of the frog is most susceptible to the remedy, then follow the rabbit, dog, cat, fowl, and pigeon. In the last-named anæsthesia can scarcely be produced. In rabbits the cornea becomes insensible in about three minutes, but the animal re-acts when the iris is seized ; if cocaine is again applied after penetrating with the knife into the anterior chamber, the iris also becomes insensible.

XII.—IRIS.

By Dr. NIEDEN.

620. v. Duyse. Aniridie double congénitale avec déplacement des cristallins. *Ann. de la soc. de méd. de Gand.* S. du 7 Oct., 1884.

621. Fuchs, E. Case of syphilitic iritis. Anatomical investigations. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 139.

622. Saint-Martin. Gomme supurée de l'iris. *Bull. des quinze-vingts*, 1884, No. 1, p. 34.

623. Saint-Martin. Kyste perlé de l'iris. *Bull. des quinze-vingts*, April–June, 1884, No. 2, p. 85.

Van Duyse (620) observed aniridia in both eyes of a boy aged ten, with dislocation of both lenses upward. Between their edge and the periphery of the pupillary area (s. v. v. !) he noticed fine radiating fibres, which he considers the zonula. He could not find the slightest trace of the ciliary processes. v. Mittelstädt.

Fuchs (621) gives an anatomical description of two eyes affected with iritis in the second (condylomatous) stage of syphilis. All the other parts of the eye were also affected. He found inflammation of the uveal tract, atrophy of the optic nerve and in the vitreous cellular infiltration. The iris contained small circumscript tumors which could not be recognized with the naked eye and whose centre contained typical giant cells. The atrophy of the optic nerve was secondary.

Saint-Martin (622) observed specific iritis and development of a gumma five days after the appearance of secondary symptoms. The gumma disintegrated and formed a hypopyon. Recovery with occlusion of the pupil. v. Mittelstädt.

Saint-Martin (623) observed after a perforating corneal wound a pedunculated cyst developing from the incarcerated

piece of iris; it relapsed after being punctured, and was finally removed by cutting the pedicle. v. MITTELSTÄDT.

XIII.—CHOROID.

624. CARO. La pilocarpina nelle malattie oculari. *Giorn. internaz. de sci. med.*, 1884, vol. vi., 6.

625. GRAHAMER, C. Contribution to the pathological anatomy of congenital hydrophthalmus. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 265.

626. HAAB, O. Further communications on tuberculosis of the eye. *Zeh. klin. Monatsbl., f. Augenhk.*, vol. xxii., p. 391.

627. HÄNSELL. Recherches sur la cyclite. *Bull. de la clin. des quinzt-vingte*, 1880, vol. ii., p. 49.

628. HIRSCHBERG, J. On metastatic sarcoma of the choroid. *Verh. d. Heidelb. ophth. Gesellsch.*, 1884, p. 112.

629. KIPP, P. J. A case of serous irido-choroiditis of both eyes, ending in total blindness. *Amer. Jour. Ophth.*, Sept., 1884.

630. LANGL, O. The diagnosis of intraocular sarcoma. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 410.

631. SAINT-MARTIN. Déchirure de la chorioide avec mydriase maxime consécutive à un traumatisme. *Bull. de la clin. des quinze-vingts*, 1884, No. 1, p. 39.

632. PROUT, T. S. Plastic exudative cyclitis. *Amer. Jour. Ophth.*, Sept., 1884.

633. REISSMANN, J. A case of tubercular choroiditis with spontaneous perforation of the sclera and sub-conjunctival tissue. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 251.

CARO (624) obtained very satisfactory results in three cases of exudative choroiditis, three of serous retinitis, and one of sclerochoroiditis posterior by injecting pilocarpine subcutaneously.

DANTONE.

GRAHAMER (625) gives a detailed account of a case of congenital hydrophthalmus, and concludes from it that serous iridochoroiditis is the primary affection, the change in the cornea being due to the increased intraocular tension produced by the disease just mentioned. The decrease in calibre of the veins of Leber's plexus and the obstruction of Fontana's space farther serve to augment the tension.

HAAB (626) describes a tumor of the choroid, the microscopical

examination of which at the time did not quite clear up its nature, whether tubercular or gliomatous. It was taken from a girl aged thirteen, and her brother dying suddenly of phthisis of the lungs, the tumor was again examined especially for tubercle-bacilli. They were found in large numbers, although the tumor had been put away for four years, thus confirming the diagnosis of a conglomerate tubercle of the choroid. The author made further experimental studies on the presence of bacilli in old hardened specimens of tuberculosis, and could demonstrate it in almost every case.

HÄNSELL (627) studied the cells of the pars cil. ret. in eyes which had been enucleated sooner or later on account of traumatic cyclitis. Experimental reproduction in the rabbit's eye of the changes observed in man failed (eleven detailed observations and clinical histories). Hänsell rarely observed division of the above-mentioned cells; generally the proliferation begins at the nucleus (Karyokinesis). The altered cell finally resembles Müller's radiating fibres or forms fibrillar connective tissue. The cells of the pars cil. ret., therefore, belong to the latter, and therefore in cyclitis continue their growth, so to speak, which had been interrupted by extrauterine life. The fibres of the ciliary muscles are forced apart by cicatricial contraction, which probably acts in a similar manner on the ciliary nerves, causing the ciliary pain. v. MITTELSTÄDT.

HIRSCHBERG (628) demonstrated microscopical specimens of a case of metastatic sarcoma of the choroid, removed from a woman aged twenty-eight, who had been operated for cancer of the breast. The left eye became affected soon after the operation under the symptoms of detachment of the retina; the autopsy revealed general sarcomatosis.

KIPP (629) gives a history in full of a case in which both eyes succumbed in succession, and in spite of active treatment, to serous irido-choroiditis. BURNETT.

LANGL (630) calls attention to the fact that the differential diagnosis between sarcoma of the choroid and simple serous detachment of the retina can often be made by oblique concentration of light upon the eye. Two cases are briefly reported.

PROUT (632) gives the histories of three cases of the condition which is sometimes called false glioma, from the fact that it is only met with in children. The microscopical examination of one eye was made by Dr. J. L. Minor, who found it to be "cyclitis

with a marked tendency to hemorrhagic exudations; all other appearances were secondary to this process." BURNETT.

REISSMANN (633) gives a clinical and anatomical description of a case of tuberculosis of the choroid in a woman aged forty-nine. The sclera ruptured spontaneously and the contents of the globe were partly discharged into the subconjunctival tissue. Typical miliary nodules with central giant cells and surrounded with epithelial round cells were found in the various tissues of the eye, as well as tubercle-bacilli. The latter were successfully transplanted. The iris and ciliary body were free from tuberculosis.

XIV.—GLAUCOMA.

634. CUIGNET. Du glaucome antérieur et du glaucome postérieur. *Rec. d' ophth.*, Nov., 1884, p. 639.

635. FUCHS, E. Glaucoma inflammatorium. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 123.

636. KAZAUROW, J. N. A case of sympathetic glaucoma. *Wjestnik Ophth.*, Nov., Dec., 1884.

637. LANDESBERG, M. Fulminant glaucoma in both eyes in a case of albuminuric retinitis. *C. f. A.*, vol. viii., p. 292.

638. MANFREDI. La lussazione spontanea del cristallino da ectopia lentis congenita ed il glaucoma secundario consecutivo. *Arch. per la sci. med.*, vol. viii., 9.

639. SARGENT, ELIZABETH. Anatomical contributions to the knowledge of glaucoma. With a heliotype plate. *C. f. .A.*, vol. viii., p. 353.

CUIGNET (634) publishes an article in which he tries to give support to the two Demarres' division of glaucoma into anterior and posterior glaucoma by the anatomical and clinical description of two cases. MARCKWORT.

FUCHS (635) gives a post-mortem examination of two glaucomatous eyes, which however had retained some sight; iridectomy had been performed upon them eight years ago for acute glaucoma, which had cured the disease and prevented the development of an excavation. The greatest changes had taken place in the ciliary body (enlargement of the ciliary processes).—Epicritical remarks.

KAZAUROW (636) observed glaucoma in the left eye, with V = $\frac{20}{60}$, excavation, pain, colored rings, etc. In the right eye glaucomatous degeneration with iridodonnesis and tremulous

cataract (after injury of the right eye from a chip of wood five years ago). Rapid improvement of the left to $\frac{20}{30}$, after enucleation of the right eye, and disappearance of the colored rings and periodic fog. In the enucleated eye, in which the zonula was partly torn off, gelatinous turbidity and inflammatory thickening of the anterior portion of the vitreous, posterior part of the vitreous liquified. Fontana's spaces obliterated, the periphery of the iris united to the cornea, disc excavated.

HIRSCHMANN.

LANDESBERG (637) observed the development of fulminant glaucoma in both eyes, the second following the first after two days, without any apparent excavation of the papilla, in a patient under treatment for albuminuric retinitis, after the retinal exudation had subsided. After the iridectomy the eyes returned to the condition before the attack, but in a second case V was totally destroyed.

MANFREDI (638) attributes the secondary glaucoma in dislocation of the lens solely to mechanical occlusion of the pupil, thus preventing the escape of the aqueous, a theory which he bases on the observation of secondary glaucoma in two cases of dislocation of the lens. He therefore recommends extraction as the only rational treatment. DANTONE.

E. SARGENT (639) gives an anatomical description of six cases of glaucoma, three primary and three secondary, in all of which she found excavation of the optic nerve, obliteration of the angle of the iris, and cellular infiltration of the anterior part of the sclera and of the cornea in as far as exposed between the lids. Primary glaucoma differs from secondary in the condition of the retina. Frequently the optic nerve was infiltrated behind the lamina, around the central blood-vessels.

XV.—SYMPATHETIC OPHTHALMIA.

640. ALT, A. A case of sympathetic neuroretinitis. Remarks on sympathetic ophthalmia. *Amer. Jour. Ophth.*, May and July, 1884.

641. DEUTSCHMANN, R. The pathogeny of sympathetic ophthalmia. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 77 and postscript, p. 331.

642. LANDESBERG, M. Case of sympathetic ophthalmia. *N. Y. Med. Jour.*, Oct. 18, 1884.

Aside from the clinical case, ALT (640) reports results from ex-

perimentation, and arrives at the conclusion "that in this experimental case the material which caused an inflammation in one eye, as well as the resulting inflammatory process, have both travelled directly from the injured eye to its fellow, and not by the optic sheaths alone, but also by the optic nerve itself."

BURNETT.

DEUTSCHMANN'S (641) very interesting experiments on animals as to the genesis of sympathetic ophthalmia were made by injecting staphylo- or strepto-coccus pyogenes aureus, which produced direct infection and inflammation of the other eye in a very characteristic manner through the track of the optic nerve and chiasma, and can, therefore, be considered a paradigm of the infectious, sympathetic ophthalmia. Inflammation was noted only in the posterior portion of the second eye, as the animal died before propagation into the anterior portion could take place, which always requires several days, as shown by further experiments. Human eyes were examined for the purpose of proving that in eyes which had produced sympathetic ophthalmia in the other micro-organisms were the transmitters of these secondary affections. In five out of six cases he found the micro-parasites, neuritis and optic perineuritis, and infiltration of the optic nerve and its sheaths with pus-cells, as well as of the whole uveal tract. The micro-organisms (stapylococcus) found in the globes in seven fresh cases of sympathetic ophthalmia were cultivated, and when introduced into the animals produced the characteristic suppuration and secondary inflammation of the other eye. The author was fortunate enough to be able to demonstrate the same cocci in the bit of iris excised in an iridectomy from a human eye sympathetically affected. They rapidly proliferated when cultivated, which, when injected into animals, produced the same inflammation in the first eye as that described above, thus making it highly probably that the sympathetic ophthalmia of man is an inflammation transmitted from one eye to the other through the optic nerves, which was primarily induced either by micro-organisms or, in rare cases, by chemical irritation. As he always found a more or less marked neuritis and perineuritis of the second eye in his experiments on animals, an occurrence which in man, however, is rare, the author has compiled these cases in which marked optic neuritis was observed, and requests that in future special attention be paid to this point; finally, he proposes to change the name to "ophthalmia migratoria." Deutschmann then adds a case of

fresh sympathetic ophthalmia, in which he not only could demonstrate the cocci in the injured eye, but also in the deposit on Descemet's membrane of the eye secondarily affected with papillitis and neuro-retinitis; these cocci he cultivated, and successfully inoculated animals with them.

LANDESBERG'S (642) patient was a man forty-one years of age, who was struck in the left eye by a splinter of metal, July 13, 1881. When seen, the cornea showed a linear cicatrix running from near the centre to the edge. The lower half of the iris was disorganized, with a funnel-shaped depression in the centre and an elevation to the temporal side. The subjective symptoms of the other eye were amblyopia and paralysis of accommodation. Fingers were counted with the left eye at two feet peripherically. Landesberg, thinking that the foreign body must be found at the cicatrix, made an incision, and after removing a part of the iris, finally succeeded in bringing out an oblong piece of metal. V in right eye began to improve, and finally reached $\frac{12}{8}$; V in the left eye also became better. BURNETT.

XVI.—LENS.

643. BECKER, O. The etiology of cataract. *Verhandl. d. Heidelb. ophth. Vers.*, 1884, p. 78.

644. FRYER, B. E. Traumatic dislocation of the left crystalline lens inward, downward, and backward; spontaneous restoration to normal position with fair vision. *Amer. Jour. of Ophth.*, Sept., 1884.

645. KAZAUROW, J. N. Simplified cataract-extraction. *Wratsch*, No. 48. First attempts at extraction of cataract according to the simplified method. *Wratsch*, No. 50.

646. LANGE, O. The question of spontaneous absorption of cataractous opacities of the lens. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 211.

647. MEYER, E. On artificial ripening of cataract. *Trans. Internat. Med. Congr. at Copenhagen. Rev. Arch. f. Augenhk.*, vol. xiv., p. 366. Recommends Förster's method.

648. DEL MONTE. L'estrazione modificata della cataratta. *Movimento med. chir.*, vol. xvi., 3, 4, 5.

649. NOYES. Case of dislocation of the lens into the vitreous and method of extracting it. *Verhandl. d. Heidelb. ophth. Congr.*, 1884, p. 90.

650. SIMI. Intorno al secondo tempo della estrazione della cataratta capsulo-lenticolari e di quelle lenticulari mature ed immature, e della maturazione artificiale di queste ultime. *Boll. d'ocul.*, Sept.—Nov., 1884, vol. vi., 1, 2, 3.

651. WECKER. L'extraction simple. *Ann. d'ocul.*, xcii., p. 207.

652. WHITE, J. A. Remarks about cataract with the report of fifty-two cases. *Trans. Va. Med. Soc.*, 1884.

BECKER (643) denies Deutschmann's statement that chronic nephritis leads to cataract, and concludes, from extensive statistics, that there is no etiological connection between nephritis and opacity of the lens.

KAZAUROW (645) uses cocaine in cataract-extractions, fixes the lids and eyeball with the fingers, opens the capsule with a knife while making the section, catches the iris on the edge of the blade after making the counterpuncture and thus excises a piece of it, at the same time finishing the scleral cut. The cataract he removes by pressure upon the globe with the lower lid. He thus performs the whole operation with one instrument, the knife. He has operated eleven cases according to this method, and is satisfied with the results. HIRSCHMANN.

LANGE'S (646) was one of fluid hypermature cataract, in which the liquid cortex spontaneously cleared up to such a degree that V rose to $\frac{4}{60}$, while the irregularly shaped nucleus became smaller by maceration. The author believes that not only was the opaque cortex absorbed, but that it was replaced by transparent substance (?).

DEL MONTE (648) performed 138 modified linear extractions, with 2.18 per cent. loss, and 4.36 per cent. moderate results. In 47 cases the capsule was opened by a curved incision at the periphery parallel to the cut in the scleral margin, and before completing the latter; the knife is withdrawn immediately after the puncture, and a round division-needle passed in through the small opening. The author concludes that carefulness, on the part of the operator, is the most essential element of success in cataract-extractions. The kind of cataract has some influence on the result; but neither the age of the patient, nor the slight movements he may make, nor atmospheric conditions, nor antiseptic treatment can bring about a poor result or counterbalance the effect of a poorly-performed operation. DANTONE.

When the lens has been dislocated into the vitreous NOYES

(649) advises to place the patient in a prone position, then, when the lens has fallen forward, to fix it with a needle-like instrument passed in from behind through the sclera, then to change the prone to the supine position and complete the extraction by making a linear extraction. He reports a case of this kind.

SIMI (650) discusses at length the opening of the capsule in cataract-extraction. The cystotome he uses has a double edge, extending to within 1 *mm.* of the point of the instrument and lying not in the median line, but at the outer side, so as to penetrate as little as possible into the cortical substance. The author tries to obtain a triangular opening by twice applying the instrument. He is opposed to extraction within the capsule as a general method. As regards the artificial ripening of cataract he considers simple division less dangerous than Förster's method.

DANTONE.

Since the introduction of cocaine WECKER (651) has made it a rule to extract without performing an iridectomy, and considers extraction with iridectomy the exception. (He does not mention the papers of Galezowski and Chavernac, who, in 1883, recommended a return to extraction without iridectomy. (These ARCH., vol. xiii., 235, 237, 238.) A few drops of the cocaine-sublimate solution recommended by Sattler (cocaini muriat. 0.5 ; hydrarg. subl. corr. 0.002 ; aq. distill. 10.0) are instilled three to five minutes before the operation, especially upon the upper half of the cornea. Wecker performs his corneal section with a knife only half as wide as the ordinary Graefe knife. After the completion of the operation the wound is covered with a layer of iodoform 1 *mm.* thick. MARCKWORT.

Of the fifty-two cases operated by WHITE (652) three were lost, two from operation, and one from septic infection from a dirty sponge. One case is interesting from a physiological standpoint. The patient became blind from double cataract when seven years of age and was operated on at the age of thirty-two. The result was good as regards the operation, but he could judge nothing of the shape of an article until he touched it, nor could he locate properly the positions of objects in space. BURNETT.

XVII.—VITREOUS.

653. BRAUÈRE. Valeur thérapeutique des courants continus dans les troubles du corps vitré. *Gaz. des sci. méd. de Bordeaux*, 1884. *La quinzaine méd.*, Nov. 1, 1884.

654. CHISOLM, J. J. Removal of a piece of iron from the vitreous by means of the magnetic needle. *Trans. of Med. and Chirurg. Faculty of Md.*, 1884.

BRAUÈRE (653) treats opacities of the vitreous with the constant current of a Gaiffe battery of twenty-four elements, with galvanometer, current-counter and rheostat, with which to regulate the intensity of the current and insure a gradual increase and decrease at the beginning and end of the applicaction, to which he attaches great importance. The kathode he applied behind the ear, the anode to the eye. The intensity of the current at first should not exceed six milliampères, afterwards not ten. Duration five minutes at first, later eight to ten.

V. MITTELSTADT.

In CHISOLM's (654) case a fragment of iron weighing four grains, ⅛ inch long and ⅛ inch wide, had penetrated the cornea, iris, and lens. A Gruening's magnet was introduced through the wound, and a second attempt brought the foreign body away. All inflammatory symptoms subsided in two weeks. A traumatic cataract remained. BURNETT.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

655. CALDERONE. Amaurosi traumatica temporanea bilaterale per commozione retinica. *Rev. clin.*, vol. xiii., July 7, 1884.

656. GUAITA. Anatomia e fisiologia patalogica della retinite pigmentosa. *Ann. d. ottalm.*, 1884, vol. xiii., 3–4.

657. HOTZ, F. C. Clinical notes on retinal hemorrhages. *Amer. Jour. Ophth.*, Sept., 1884.

658. DICKEY, J. L. A case of glioma retinæ. *Amer. Jour., Med. Sci.*, Oct., 1884.

659. RÜBEL. Case of amaurosis due to bromide of potassium. *C. f. A.*, p. 294. Observed in an insane epileptic. The report is too short to consider the diagnosis beyond doubt.

560. RYDEL. The treatment of detachment of the retina and the results obtained at Jagiella's ophthalmic clinic, at the University of Cracow. *Przeglad Lekarski*, 1884.

661. WADSWORTH, D. F. A case of permanent zonular scotoma of traumatic origin ; very small circle of central field with vision normal. *Amer. Jour. Ophth.*, Oct., 1884.

CALDERONE (655) relates an interesting case of commotion of the retina. A gun was fired close to the face of a young man,

without however producing any visible injury, with the exception of a few grains of powder which penetrated into the skin; but vision was lost at once, V=o. No ophthalmoscopic changes. After the lapse of three hours central, after six hours peripheral perception of light returned. After twenty-four hours one eye had completely recovered, after forty-eight the other also.

DANTONE.

The microscopic examination made by GUAITA (656) of two eyes blind from retinitis pigmentosa showed the following:

Pigmentation of the retina most marked at the equator, gradually disappearing towards the ora serrata and extending back to within ½ *cm.* of the fovea centralis; the optic disc, projecting somewhat, lies at the edge of the round, unpigmented spot. With the microscope: Degeneration of the optic nerve fibres, much new connective tissue at the papilla. The retina has undergone material changes in all its layers. Larger remnants of the rods and cones, the visual cells, are found at the posterior pole and around the papilla, but nearer the equator they are all destroyed. The elements of the layer of ganglion-cells are well preserved near the optic nerve, gradually disappear farther forward, and are entirely absent at the line of the greatest pigmentation. Only the supporting-tissue has not suffered, and has even proliferated. The calibre of the blood-vessels was diminished by thickening of the walls, small branches were entirely obliterated, the blood-vessels are converted into fibrous cords. There are also traces of newly formed and again obliterated vessels. The pigment is collected in smaller or larger patches, especially on the walls of the blood-vessels, and there particularly at their bifurcations, in loose small granules or in polygonal cells, similar to those of the pigment-epithelium. At the points of greatest pigmentation the granules are distributed throughout the whole supporting-tissue, even far away from the blood-vessels. The pigment-epithelium itself has undergone marked changes, the cells have lost their regularity of form, size, and position,—in some spots they are collected in large masses and are grown together with the supporting-tissue, especially at the accumulation of pigment upon the blood-vessels. In view of these conditions the author considers retinitis pigmentosa an angiosclerosis of the retina, advancing from the periphery towards the centre, and due to a general nutritive disturbance, especially syphilis. As nutrition is interfered with on account of the thickening of the blood-vessels and the obliteration of the smaller

branches, a collateral circulation develops from the capillaries of the choroid, which passes through the pigment-epithelium and causes its cells to wander. The hemeralopia he attributes to a disturbance of the development of the visual purple, due to the changes of the pigment-epithelium. DANTONE.

HOTZ (657) observed retinal hemorrhages of unusual size in the region of the macula with perfect recovery of vision. The hemorrhage came on immediately after immersing the feet in cold water during menstruation. BURNETT.

In DICKEY'S (658) case a red reflex was noted from the child's left eye in its infancy. When eighteen months old it was removed, but no report was made of its examination. Six months later the right eye began to fail under all the appearances of glioma retinæ. The eye was removed and sent to Dr. Knapp for examination, who reported typical glioma. In six weeks metastatic tumors began to appear in the orbit and head. Death a year and a half after enucleation of the first eye. BURNETT.

RYDEL (660) found that detachment of the retina is the cause of blindness in about five per cent. of all cases, and that ninety per cent. of such eyes were myopic. The treatment consists in puncturing the sclera and in injecting pilocarpine. The clinical history of fifteen cases is given at greater length. Of these two were treated by puncture, three by puncture and injections of pilocarpine, and ten with injections only. The result was: Of the first five, one was a failure, two were perceptibly, and one only slightly, improved. Of the thirteen treated with injections of pilocarpine, three were failures, six were moderately improved, one markedly, and three were completely cured. Of the last-named, two had remained well more than a year later.

A man was run over by a wagon. WADSWORTH (661) found on the third day after the injury multiple hemorrhages in the retina of the right eye, with $V=\frac{14}{200}$, V in $L=\frac{14}{16}$. The hemorrhages were absorbed and V improved, but with a central scotoma, inside of which was a small field (2″ at 14 ft.), in which $V=\frac{14}{16}$. In a number of years the condition has remained unchanged.

BURNETT.

XIX.—OPTIC NERVE.

662. FOX, L. W. Clinical observations. *Amer. Jour. Ophth.*, July, 1884.

663. PARISOTTI et DESPAGNET. Fibrome du nerf optique. *Rec. d'ophth.*, Dec., 1884, p. 720.

664. SIMI. Sopra un caso di nevrite ottica. Storia e considerazioni. *Boll. d'ocul.*, Sept. 1, 1884, vol. vii., and *Rec. d'ophth.*, Oct., 1884, p. 603.

FOX (662) observed a case of acute uniocular neuritis. No history of syphilis, recovery complete as to vision. Quinine amblyopia cured by the internal administration of hydrobromic acid.

BURNETT.

PARISOTTI and DESPAGNET (663) describe a case of fibroma of the optic nerve ; the neoplasm had begun in the outer sheath of the optic nerve, had entered and filled up the intervaginal space, and then had involved the inner sheath of the optic nerve.

MARCKWORT.

SIMI (664) observed a case of almost instantaneous blindness from optic neuritis after the use of one of Pagliano's cathartic powders (scammonium and colocynth). The patient, aged twenty-five, was seized, three days after taking the powder, with violent retention of urine and constipation. On the fourth day intense neuralgia of the 5th nerve and amblyopia developed, the latter increasing in course of forty-eight hours to absolute blindness of both eyes. The ophthalmoscope showed choked disc and œdematous infiltration of the retina in both eyes, dilated, tortuous veins, and ischæmic arteries of varying calibre. Bromide of potassium was given ; perception of light returned after two days ; after three days the patient could walk again alone ; two months later V in the right eye was almost $\frac{20}{20}$, in the left $\frac{10}{20}$, field of vision complete ; he was, however, blind for all colors except yellow, which was perceived in a narrow field in both eyes, and red, which was faintly perceived with the right in a very small circle. The author explains the ocular affection by assuming it to be a reflex action from the abdomen upon the sympathetic nerve.

XX.—INJURIES, FOREIGN BODIES (PARASITES).

665. CLIZBE, S. H. Foreign body remaining quiet in the eye for twenty-three years. *Amer. Jour. Ophth.*, Oct., 1884.

666. FANO. Rupture de la sclérotique par suite de violence exercée sur la région oculaire. Hernie sous-conjonctivale d'une portion du corps vitré. *Jour. d'ocul.*, May, 1884, p. 162.

667. KIPP, C. J. Clinical notes of cases of foreign bodies lodged in or on the iris and in the anterior chamber. *Amer. Jour. Ophth.*, July, 1884.

668 KRÜKOW, A. Removal of a needle from the eye with the electro-magnet. *Wjestnik Ophth.*, 11, Nov., Dec.

669. MANFREDI. Un caso di cisticerco sotto conjunctivale ed annotazioni istologiche sulla retina cisti avventizia. *Otti della R. Acc. di Med. di Torino*, 1884.

670. SAINT-MARTIN. Enucléation d'un moignon douloureux renfermant un corps étranger depuis 15 ans. *Bull. des quinze-vingts*, 1884, No. 2, April–June, p. 86.

671. PICQUÉ. Contusion oculaire par coup de poing. Perte immédiate de la vision. Absence de complications inflammatoires. Mort par scirrhose. Examen de l'œil. *Soc. anatom.* Séance du 25. Janv., 1884.

672. SHAFFNER, CHAS. Traumatic rupture of retina and choroid by a plush ball. *Med. News*, July 5, 1884.

673. WEBSTER, DAVID. Loss of an eye by traumatism ; a phenomenal symptom. *N. Y. Med. Jour.*, Sept. 27, 1884.

In CLIZBE's (665) case the body was a piece of iron buckle $\frac{3}{4}$ in. long and $\frac{1}{16}$ in. diameter. There was much pain and inflammation at the time, but for 23 years it had occasioned no trouble. It was removed by forceps. BURNETT.

In FANO's (666) case the ruptured sclera healed in eight days after puncturing the conjunctiva and applying a compressive bandage ; a sclero-choroidal staphyloma however developed later. v. MITTELSTÄDT.

KIPP (667) observed the following cases of injury of the anterior portion of the globe : 1. Fragment of steel in the lower part of the iris ; removed with iridectomy eight days after entrance ; recovery. 2. A piece of soft solder in the iris ; extraction sixteen hours after the accident ; complete recovery. 3. Fragment of iron in the iris ; iritis on following day ; iridectomy on second day ; complete and speedy recovery. 4. A piece of iron in the iris ; extraction of the foreign body five weeks after the accident ; recovery. 5. Piece of iron on the iris ; extraction without iridectomy ; recovery. 6. Fragment of iron on the iris ; extraction with magnet ; recovery. 7. Burn of cornea ; fragment of stone on the iris ; extraction on second day ; recovery. 8. A large piece of stone in the anterior chamber for two years without producing disturbance. 9. A bird-shot in the lower part of the anterior chamber for eight years without causing irritation. 10. Spontaneous expulsion through the cornea of a large piece of gun-cap four years after its entrance into the eye. BURNETT.

KRÜKOW (668) succeeded in removing with Hirschberg's electro-magnet a piece of needle twenty-four *mm*. [?—H. K.] in length after it had remained in the eye two weeks. The eye healed well.
HIRSCHMANN.

MANFREDI (669) describes a cysticercus which was situated under the conjunctiva of the globe in the upper inner quadrant of the right eye. The tumor, which was the size of a pea, began five to six *mm*. from the cornea and extended to the semilunar fold. It was easily excised. The microscopic examination of the cyst showed that its wall consisted of two concentric layers, the outer one of which consisted of compact connective tissue containing many capillary blood-vessels. The inner layer was composed of granulation-tissue with numerous giant cells, and covered here and there with flattened elements, which might prove to be endothelium, if examined according to other methods and in different stages. This cysticercus was the thirteenth observed in Italy, and the third subconjunctival one. DANTONE.

SHAFFNER (672) reports that when he examined the eye soon after the injury the left had M = 6 D and V = $\frac{4}{200}$; the uninjured right H = 1.5 D and V = $\frac{18}{20}$. The rupture had taken place as usual about the posterior pole of the eye. In 11 days there was H in left $\doteq$ 2.25 D and V = $\frac{15}{200}$, and neuritis had set in. Seven days later V in left eye was $\frac{15}{20}$. BURNETT.

WEBSTER (673) reports : The right eye was injured by a piece of steel from a broken chisel in 1874. V was reduced but not destroyed. In 1882 a cataract, with total posterior synechiæ, had developed. In 1883 he observed that blood would appear in the anterior chamber and disappear on quitting work. These hemorrhages occurred frequently, and could be brought about by bending the head forward. The eye was enucleated and there were found hemorrhages, recent, as well as old, in all the cavities, posterior synechiæ, commencing degeneration of the lens, complete detachment of the retina, with œdema and proliferating degeneration of the retina. BURNETT.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

674. BIERWIRTH, A. M. A case of pernicious anæmia. *Amer. Jour. Ophth.*, Aug., 1884.

675. CALLAN, P. A. Atrophy of both optic nerves as a sequel of whooping-cough. *Amer. Jour. Ophth.*, Oct., 1884.

676. FRIEDENWALD, A. Uræmic amaurosis. *Med. News*, Aug. 9, 1884.

677. HUTCHINSON, J. Relation of certain eye-diseases to gout. *Brit. Med. Journ.*, Nov. 22, 1884, p. 995.

678. LITTLE, W. S. The value of pupillary symptoms in general disease. *Amer. Jour. Ophth.*, July, 1884.

679. OTTOLENGI e CONTI. Il senso cromatico nei sifilitici. *Gazz. d. clin.*, 1884, vol. xx.

680. PARINAUD. Troubles oculaires de la sclérose en plaques. *Prog. méd.*, 1884, No. 32, p. 641.

681. RAMPOLDI. Azioni riflesse dall' apparato digerente a quello visivo. *Ann. d. ottalm.*, 1884, vol. xiii., 3-4.

682. TUFFIER. Polyurie et hémianopsie d'origine traumatique. *Rev. de chir.*, Oct. 1884, No. 10, p. 827.

683. VOSSIUS. Lepra of the eye. Attempts at infection of rabbits by inoculation into the anterior chamber, in connection with a case of lepra Asiatica. *Verhandl. d. Heidelb. ophth. Gesellsch.*, 1884, p. 27.

In BIERWIRTH'S (674) case the ophthalmoscopic examination was made by Dr. Alt, and the usual signs of the disease were found: small arteries, large and tortuous veins and numerous striped hemorrhages. There was an improvement under the use of tonics. BURNETT.

CALLAN (675) supposes that in his case the atrophy was due to a neuritis set up by a congestion of the brain due to the whooping-cough. BURNETT.

After considering generally all the forms of eye-affection associated with uræmia FRIEDENWALD (676) gives the histories of two cases of sudden amaurosis without ophthalmoscopic signs due to uræmic poisoning. In one, due to pregnancy, premature labor was induced for the relief of the patient. BURNETT.

At the meeting of the Ophthalmological Society of the United Kingdom on Nov. 13, 1884, in honor of Sir William Bowman, HUTCHINSON (677) delivered a lecture on "The Relation of Certain diseases of the Eye to Gout." He defines gout as "all states of health which are, whether directly or remotely, connected with the accumulation of lithate of soda in the blood, as the result of over-feeding or defective assimilation." Hutchinson supposes the case of an individual subjected many years ago and for a long period to the ordinary causes of this form of gout, but who for

several years has avoided them. Though for a long time past his blood may have been free from urates, yet his tissues may be prone still to suffer in a peculiar manner when exposed to the ordinary exciting causes of diseases. If such an individual have children they will inherit his tissues and consequently his tendency to the various derangements from which he suffered. Hutchinson next proceeds to describe the various affections of the eye which are found associated with the gouty diathesis. The first is a condition which, for want of a better name, he has long been in the habit of recognizing as "hot-eye." It is one of the phenomena which attend quiet, *i. e.*, not acutely paroxysmal, gout. Usually one eye is affected. The conjunctiva becomes red and the eyeball feels hot, and pricks as if sand were in it; sight is slightly dim. Not infrequently it is the precursor of an attack of iritis. Hutchinson recognizes various forms of arthritic iritis, the common one being that in which the iritis occurs in acutely transitory paroxysms. The tendency to form adhesions is very great. The disease generally restricts itself to the iris and shows no tendency to disorganize the globe. He considers that the reason why gonorrhœal rheumatism so often causes iritis, is because it occurs usually to the subjects of inherited gout. There is another form of arthritic iritis which more frequently attacks women, a very considerable proportion of whom have a history of gout in former generations. This form is apt to spread to the ciliary body and choroid, to persist and to prove destructive. Those cases in which it occurs in association with glycosuria, are according to this experience almost always the subjects of gout also. Relapsing cyclitis and optic neuritis can rarely be traced back to gout, but hemorrhagic retinitis is rarely seen except in gouty persons. In summing up he divides the different affections into two groups: 1st, those which go with acquired, humoral or renal gout; 2d, those which accompany hereditary gout. In the one, attacks of a transitory nature are the rule, and these attacks are often acute and attended by much pain. In the second group, although a tendency to temporary recovery and recurrence is often observed, yet there is a great proneness to chronicity and persistence. "In the former group we have placed hot-eye, scleritis, recurrent iritis and hemorrhagic retinitis. All these are diseases of adult life. In the second group we have insidious disorganizing iritis, relapsing cyclitis, certain forms of soft cataract, and, perhaps, some of primary optic neuritis."

FITZGERALD.

The result arrived at by LITTLE (678) from his own observations (658 cases) and those of others is that in acute nervous diseases 23.3 % show some variations of pupillary condition from the normal, while in insanity of all grades the pupils are affected in 23.5 %. BURNETT.

OTTOLENGI and CONTI (679) found among 310 syphilitic individuals (276 with secondary, 34 with tertiary symptoms), who were tested with Holmgren's woollen skeins, 5 color-blind (1.61 %). No ophthalmoscopic changes were observed. The authors conclude that disturbances of color-perception, which may occur as the result of syphilitic changes in the retina and optic nerve, or in the cerebral centre of color-perception, must not be confounded with true, typical, congenital color-blindness. DANTONE.

PARINAUD (680) discusses the ocular symptoms in multiple sclerosis. Among the muscular disturbances nystagmus is the most important. Parinaud attributes it to paralysis of the centres of association, although it is present when paralysis is very difficult to demonstrate, or decreases while the latter increases. Inequality of the pupils is frequent in the beginning of the disease; afterward myosis is the rule, where the reaction to light and accommodative efforts remains, in contradistinction to tabes. Visual disturbances appear very gradually, and frequently are slight. Dyschromatopsia for red and green manifests itself early, the papilla appears only slightly effected, a little paler in the temporal half. In other cases the course of the disease is more rapid and complete, though only temporary blindness ensues, blindness not persisting in this affection, even in marked atrophy of the discs. A third form consists in monocular amblyopia with limitation of the visual field, but without dyschromatopsia. White atrophy of the optic nerve. v. MITTELSTÄDT.

RAMPOLDI (681) in discussing visual disturbances due to the digestive organs, mentions five cases of mydriasis, diplopia, amblyopia, asthenopia, and photophobia, together with neuralgic pains, in which these symptoms were traceable to helminthiasis (in four cases ascarides, in one taenia) and disappeared at once when the worms had been removed. DANTONE.

TUFFIER'S (682) case was that of a laborer, in whom a fall had produced fracture of the frontal bone with deep depression of the bone. It was followed at once by deep coma, complete anæsthesia, and paralysis of the sphincter muscles. On the third day ecchymoses and chemosis of the conjunctiva. A few days later

a stage of excitation followed, during which the absence of paralysis of any kind was made certain. After two months incision of a phlegmonous abscess in the region of the wound, then gradual recovery. The most prominent symptoms were: great thirst, polyuria (10–12 litres of urine daily without albumen or sugar); adduction of the right eye slightly diminished, sense of smell impaired on the right side, V intact, right papilla atrophic. Temporal hemianopsia in both eyes. No sensory or motor paralysis. The polyuria was diminished by the use of ergot.

v. MITTELSTÄDT.

REVIEWS.

Clinical Studies on Diseases of the Eyes. By FERDINAND RITTER VON ARLT. Translated by LYMAN WARE, M.D., of Chicago. Published by P. Blakiston, Son, & Co., Philadelphia. Price $2.50. (Reviewed by Dr. J. A. SPALDING.)

Three or four years ago, von Arlt, the veteran ophthalmologist of Vienna, gave to the world the first part of a long promised treatise on the diseases of the eye, including those of the conjunctiva, cornea, iris, and sclera. At that time we read with much pleasure the original work, distinguished as it was for the clearness of its views concerning the ætiology, pathology, and prognosis of diseases of the eye as well as for the broadness of culture which it displayed in the treatment of these diseases. Without a single illustration to attract the reader, the solid learning displayed on every page enchained his careful attention. We have since patiently waited, though in vain, for the continuation of this excellent book. It is quite probable that Dr. Ware, the translator, felt, like ourselves, that here was a hand-book well worth turning into good English, but that it were better to delay so difficult a task until the continuation or conclusion appeared. Time having passed by, and von Arlt being still silent, the translation of his views has at last been accomplished, and here we have them before us in the form of a stately volume, yet not too heavy for the hands, with bold, clear type, pleasant borders, not too shiny paper, and ending with a moderately satisfactory, though by no means a copious index. It is on the whole a subject for regret that the index is not fuller, doubled up, as one might say. Thus, for instance, on page 131 we see a short section devoted to "Keratitis after intermittent fever," a topic, by the way, capable of development and well worth study and investigation by the practitioners of our Western States where malaria abounds. Nevertheless, in

the index, we look uselessly for such a title under the head of "Keratitis," while "intermittent fever" and "fever" and "malaria" are not mentioned at all. To be sure, we find "Keratitis, malarial," but one would more naturally have searched first for "malaria" or "intermittent fever," to see if there were any diseases of the eye associated with malaria, yet it seems to us that as the author has entitled the section thus and so, it would have been better to follow his dictation in the index. These are indeed trifles, yet from a book like this, put forward as a standard text-book, one would like at times to get an instantaneous photograph of the opinion of so competent an authority as von Arlt. Without a double, or even a three-fold, index, such a procedure is quite impossible in one's hasty hours of office practice. Let us hope, then, that in future editions of this, as of all text-books in ophthalmology, or in medicine and surgery, we shall have a superabundant index.

The translation has been accomplished very successfully. We have taken pains here and there to open the original, and then to search for the parallel passage in the English version. Considering the somewhat perverse and obstinate German employed by von Arlt, like the current of a country brook dashing over the stones and logs of involved paragraphs and parentheses, we cannot help congratulating Dr. Ware upon his remarkable and felicitous results at translation and arrangement. How well he has avoided the translator's *bete noir*, that clinging too closely to the text, the great fault of innumerable students who fancy that the original must be reflected unbroken in another language.

Here let us call attention to a minor point—the use of the expression "acuity of vision." Though employed in a large number of text-books, yet the word "acuity" has no place in our language, and ought to be abolished from ophthalmology. For there are a number of expressions equally significant, and even they are quite superfluous. If we say that vision has decreased, to such and such a degree, or that sight amounts to so and so, or that the acuteness of vision is perfect or diminished, or if we simply employ the initial S we have done enough, and have saved ourselves from tautology and the use of that barbarous term "acuity."

Willing as we are to acknowledge von Arlt's ability in the manner in which he has here unfolded his views on the ætiology, pathology, and prognosis of the eye, we must chiefly, and yet briefly and without extravagance, commend him for the broad, catholic, and extra-

ordinarily diversified method of treatment so clearly laid down for so many essentially different types of disease. We cannot help expressing surprise at the fulness of the treatment suggested, for instance, in cases of ulcers and abscesses of the cornea. It seems as if suitable treatment were here offered us for every possible type of corneal ulceration or abscess, so that in any patient's applying sufficientiy early, we ought never to lose an eye. The same may be said concerning the treatment of iritis, in its manilold aspects. We are glad also to notice how much space is given to constitutional treatment, and it is thus very evident that von Arlt, though anti-dating the school of v. Graefe, has never, even in old age, fallen into the glaring, modern, and fashionable error of regarding almost all diseases of the eye, as chiefly local, and demanding nothing but local treatment.

In conclusion we will truthfully, gladly, and honestly declare, that although this text-book is not indispensable to every ophthalmic surgeon, yet we will assert that no one who preposes or offers to treat diseases of the eye can fail to leave its interesting pages, without having learned something entirely new, or, at least, without having refreshed and invigorated his mind with views which are the result of fifty years of experience in one of the world's largest ophthalmic hospitals and cliniques.

Der Elektro-magnet in der Augenheilkunde (The Electro-Magnet in Ophthalmic Surgery). By Prof. Dr. J. HIRSCHBERG, Berlin. (Reviewed by Dr. J. A. SPALDING.)

Professor Hirschberg has given us in this genial and interesting monograph a work which in style and contents rival the recent publications of the celebrated ophthalmic surgeons of Düsseldorf and Vienna, the skilful Mooren and Mauthner. Rarely has it fallen to our lot to peruse so charming and yet so thoroughly scientific and instructive a book. Yet, leaving aside all this well-deserved praise, let us offer for the readers of these ARCHIVES a summary of this lately published book.

Here we have first an historical introduction; then a detailed account of Hirschberg's thirty or more cases; and, finally, a complete review of every case of the removal of iron from the eye with the help of the electro-magnet that has so far been published.

The historical introduction shows us that two hundred and fifty years ago Fabricius attempted to remove iron from the cornea with a magnet, and that one hundred years ago Morgagni and others actually removed bits of iron from corneal abscesses. It is,

however, difficult to prove who thus first removed iron from the *interior of the eye.* Himly (1837) at all events employed the magnet to withdraw iron which, though still resting in the cornea, penetrated into the anterior chamber. Some have awarded, unjustly, the priority to Dixon, of London, but he only used the magnet "to attract the foreign body toward the sclerotic, where it might be more readily grasped with the forceps." McKeown, of Belfast, Ireland, was probably the first to penetrate the vitreous with a magnet, and by this means to remove successfully a piece of iron. The patient's eye exhibited a perforation in the cornea. An incision was made in the sclerotic, and an attempt made to grasp the iron with forceps. As this procedure failed, a magnet was introduced, and the foreign body, weighing 30 *mgr.*, removed. The patient could subsequently read S 2 at 1′. All of McKeown's cases are here given in full detail, but despite their publication in various medical journals (1874 to 1878), no surgeon appears to have immediately followed their suggestions.

During his student years under v. Graefe, Hirschberg never saw a single case of magnetic extraction, and only heard the suggestion laughed at as a dream. v. Hasner, of Prag, however, proposed that forceps and knives should be magnetized for the removal of iron from the lens. In 1875, before he had heard of McKeown's cases, Hirschberg attempted, though unsuccessfully, to remove a bit of iron from the vitreous with the aid of a common horse-shoe magnet. He subsequently experimented on rabbits, and in 1879 made his first successful magnetic extraction in man. Since then he has performed this operation about thirty times, with more perfected instruments. He now uses a magnetic machine made by Doerffel, of Berlin, costing from thirty marks upward, with zinc-carbon elements in a glass jar holding one litre. He renews the fluid from time to time, and always tests the energy of the current previous to the operation. Wires lead to the coil, to the end of which are screwed points of various shapes, which are washed with benzoate of soda or a weak sublimate solution before being passed into the eye. The apparatus will lift a piece of iron weighing five hundred grammes. There is no danger of a bit of iron being repulsed by the point of the magnet, because it happens to be magnetized negatively. There is no need of the enormous machines proposed by Voltolini, for a magnet like Hirschberg's will easily remove any piece of iron that is likely to hit the eye. Besides this, large machines may do more harm than good—

pulling off from the iris, for example, pieces of iron with so much force as to cause traumatic cataract, while with the Doerffel machine the traction is so slow and gentle, yet so certain, that such an accident is impossible.

Voltolini asserts that the click of the foreign body striking the magnet cannot be heard, but Hirschberg declares that he has heard it in a large majority of cases.

The magnets used by other oculists (Snell, Bradford, etc.) are mentioned as of value, while Gruening's permanent magnet is defined as an anachronism. Pooley's method of diagnosticating the *position* of a foreign body in the eye by a hanging magnet is of doubtful utility.

We are next treated to a full description of Hirschberg's thirty-two cases of magnetic extraction of iron from the interior of the eye, from which let us gather all that is valuable as we pass along. One case is interesting on account of the rapid disappearance of hypopyon after removal of iron from the iris. We are also reminded by this case, that by employing the magnet we can often escape excision of the iris, a complication rarely to be avoided when we use mechanical means. In another case of a *minute* piece of iron in the lens, the cataract-knife was magnetized and the offending particle removed. The patient recovered with perfect sight. In cases of *minute* chips of iron in the lens we are advised to try the effect of magnetized instruments, before resorting to the magnetic battery. A similar case was treated unsuccessfully, because after removal of the iron as just suggested the lens was left in position, where it began to swell, and was finally removed, the operation terminating however in total loss of vision.

Comparison of the magnetic extraction of iron from the lens with the old method shows, nevertheless, that the former offers no great advantages over the latter, except that when using the magnet the foreign body never falls into the vitreous. In six cases out of eight by the old method, the visual results were excellent. When the foreign body was large, it was extracted before the removal of the lens; when small, it was grasped with the forceps; when minute or almost invisible, it was removed with the lens. To quote Hirschberg: "I emphasize these results, because I have no desire to praise the new method at the expense of the old."

Section Five treats of the removal of iron from the vitreous, and as this is the most important province of magnetic extraction in ophthalmic surgery, we propose at this point to dwell carefully

upon the indications and suggestions scattered richly about. The path for reaching iron in the vitreous may be made by a meridional section in the sclera, or by a corneal section after extraction of the lens, or after capsulotomy. One of these operations is to be undertaken (*a*) primarily: before irritation has made its appearance, within twenty-four hours after the penetration of a *small* splinter; or (*b*) secondarily: during the stage of irritation, and up to the time when the latter may have increased to circumscribed or even to diffuse suppuration in the vitreous; or (*c*) thirdly: when, after all irritation has ceased, a new inflammation is excited months or years later by a change in the location of the piece of iron. If, on the other hand, *the path to the foreign body is still open, and if, moreover from, it is still* EASILY ACCESSIBLE, the magnet should be introduced along this opening.

A piece of iron is *small* for the vitreous chamber, when it weighs from 25 to 30 *mgr.*, and with such a piece of iron we may obtain perfect success and even at a late date; it is moderately large when it weighs from 50 to 150 *mgr.*, in which case the *primary* operation is alone likely to be successful; it is too large when it weighs from 200 to 500 *mgr.*, in which case the promptest primary extraction cannot restore vision, and *even preservation of the eyeball is doubtful.*

The indications for operating cannot be precisely defined, for all cases are different. But the operation must be done early. If we see a patient in the first stage with a small piece of iron in the vitreous, it is best to operate without delay. If the opening lies in the cornea, and especially near its margin, the scleral section is preferable and offers greater chances of success. If the opening lies in the sclera at a proper distance from the cornea and the foreign body is visible in the coagulum, or can be seen through the cornea, the magnet may be at once introduced, the opening having been reasonably enlarged if necessary. If a scleral section must be made, we should etherize the patient (the pain in removing the foreign body is reported to be very excruciating), and choose a spot rather downward and outward than downward and inward. It is not necessary to divide any muscles (unless a foreign body lies far back in the eye, close to the optic papilla), nor to make any conjunctival flap. The section should be made well behind the ciliary region and in a meridional direction, because we shall thus spare those fibres of the sclera which are essential for the preservation of the shape of the eyeball. If we make an equato-

rial section the eye is subjected to the danger of collapse and total destruction. With a compass we measure off about 8 *mm.* from the lower and outer margin of the cornea, grasp the conjunctiva at this point with a delicate forceps while the assistant rolls the globe upward with strong forceps, then plunge a v. Graefe's knife several *mm.* deep into the vitreous in order to open up a path to the foreign body, and then finish the section by enlarging the incision towards the equator of the eye for a distance of about 6 *mm.* The magnet is then introduced, left inside the eye for a few seconds, and—if our diagnosis is correct—withdrawn with the foreign body attached. The conjunctiva is then sutured over the incision, antiseptic dressings applied, and the operation is finished.

The great difficulty in these cases lies in the diagnosis. If iron has penetrated the cornea, we see the cicatrix in that coat, the rupture in the iris, the incipient opacity in the lens, and the deeper-seated vitreous opacity with perhaps a shiny reflex. If it has passed through the sclera, we see the wound, perhaps a bead of vitreous, perhaps a clot of blood, lying between its lips, or we may see a clot of blood in the vitreous or *bubbles of air.* The chief difficulty of all lies in discovering the position of the missile when it cannot be seen. But even then it must lie within the vitreous chamber after rebounding, or else it is embedded in the retina; Hirschberg never saw one penetrate the eyeball entirely. Hence we must wait until hypopyon appears, or until we gain some satisfactory idea of the position of the foreign body from a circumscribed inflammation of the vitreous, or until the danger of panophthalmitis appears too excessive to be risked.

We ought not to probe the globe with a magnet without proper antiseptic precautions; we may probe more confidently *if the opening lies in the sclera.*

In the second stage we should operate at once.

Occasionally we see patients in the third stage, and a case is recorded in which, despite the presence of iron in the eye for sixteen years and a cataract and well-marked irido-cyclitis, the finest type could at last be read after removal of the iron with the magnet.

When shall we extract iron through a linear or flap section at the margin of the cornea? (*a*) When the patient is young, the foreign body not far behind the lens, the cataract mature, and irritation has ceased; (*b*) when the lens has already been removed, or has been absorbed, and when only a thickened capsule is left behind.

If the foreign body is small and the eye is seen in the first or second stage, and the lens is only partially opaque, the scleral section is preferable ; later, we can extract the lens when mature.

If the eye is ruptured or incised for a distance of 6 to 10 *mm.*, the globe collapsed, or half full of coagulated blood, the magnet performs a genuine surgical triumph in withdrawing a large piece of iron, weighing from 200 to 500 *mgr.*; but vision is not restored.

The danger of sympathetic ophthalmia is slight after using the magnet.[1] Although enucleation, several times after, proved to be necessary for successful removal of the foreign body, it was only performed in cases in which the eye appeared to be irritated after violent labor. *As a matter of course, enucleation was always done if the iron could not be discovered with the magnet.*

Hirschberg does not believe in neurotomy. Although he has performed over 500 enucleations, he never saw any bad results. A conjunctival suture is always used after this operation.

If the patients are willing to submit to several months of the closest watching, enucleation is not frequently necessary after successful removal of iron with the magnet.

A case is reported in which, despite panophthalmitis, the eye was saved after removal of a piece of iron weighing 31 *mgr.*; and in another the same result was obtained, after removal of a large piece weighing ONE THOUSAND AND FIFTY *mgr.*

In conclusion, Hirschberg says : "If in the long list of extractions of iron from the vitreous with the magnet which I have performed in the last five years, I have succeeded twice in obtaining excellent vision, once a remnant of vision, and twice in preserving the shape of the globe, the difference in favor of this method, in comparison with the ante-magnetic era, will be more marked when I say, that in the first ten years of my practice I never succeeded a single time in saving a trace of sight when I attempted successfully or unsuccessfully to remove pieces of iron from the vitreous by purely mechanical means."

We have now followed in full detail the indications for the use of the magnet in removing iron from the vitreous. Several times enucleation had to be performed at a later date, several times the attempt at extraction was useless and enucleation was at once performed ; sympathetic ophthalmia was never seen. The results are certainly promising, and the clinical histories so fully given

[1] Unless, as in Aub's case of *two* pieces of iron in the eye, one had been left behind when the other was withdrawn with the magnet.

prove that the magnetic extraction of iron from within the eye opens a new era in ophthalmic surgery.

At the end of his histories, Hirschberg adds a word in favor of the use of protecting-glasses, and urges their universal adoption by workmen exposed to chips of iron, brass, or granite, etc. As an unanswerable argument, he cites the case of a workman who brought to him a piece of iron weighing SIX THOUSAND AND TWENTY *mgr.*, which had simply shattered the protecting-glasses without injuring the eye. And again, he operated for traumatic cataract in an old man, and only obtained S $\frac{1}{5}$, because the cornea was covered with minute scars due to foreign bodies, all of which, as well as the traumatic cataract, might have been avoided by the use of protecting-glasses.

The third chapter of this monograph extends over sixty additional pages, and narrates all the cases of magnetic extraction hitherto published. Into this we will not deeply enter, for we have already occupied much valuable space, yet it will well bear careful perusal for its numberless suggestions in regard to the technique of the operation, and especially in their bearing upon the results of the same. We will, however, call attention to a case observed by Snell, in which *sympathetic ophthalmia developed thirty-two days after enucleation*, and likewise emphasize the excellent results of magnetic extraction obtained by Rheindorf—viz., out of ten cases, the eyeball preserved a normal appearance four times, in four others the external appearance was excellent, in the two remaining enucleation had to be performed. In none, however, was vision restored, but in six or seven at least it had been hopelessly destroyed by the injury.

Finally, let us express the hope that some American publisher will give us this monogragh in an English version, and in some small and easily handled volume, or in the cheap unbound form, as we have it here, with bold, clear type, large handy pages, and proper margins for annotations. Meanwhile we can, and do, heartily commend the German original for its excellent and trustworthy indications for using the magnet in these correctly-called capital cases, and cordially praise the worthy Professor Hirschberg for not exulting too oratorically over the truly remarkable results that he has thus far obtained by his magnetic extraction of dangerous chips and masses of iron from the interior of the eye.

J. A. S.

MISCELLANEOUS NOTES.

DR. UHTHOFF has established himself as Lecturer (privatdocent) on Ophthalmology at the University of Berlin.

The Ophthalmological Society meets at Heidelberg from Sept. 14 to Sept. 16, 1885. The members are requested to send the name of their choice for the Graefe medal to the secretary of the society.

The original drawings of JAEGER'S famous "Atlas of the Diseases of the Fundus of the Eye" were recently sold to Professor Norris, in Philadelphia, for 4,500fl. (about $2,000), as reported by the *Med. Ztg*. The enormous amount of labor and care expended upon these drawings can be inferred from the fact that Ed. Jaeger worked on some of them two hundred hours. It is a great pity that such a treasure should go to America, says the above Vienna medical journal.

DR. HIRSCHLER, Professor of Ophthalmology in Budapest, has been appointed by the Hungarian government a member of the Hungarian Upper House (Magnatentafel), in acknowledgment of his excellent character and his eminent, both practical and scientific, merits in his profession. In Austrian papers this honor is mentioned with particular satisfaction, as in former years due recognition and advancement was withheld from Dr. Hirschler because he was a Jew.

VOL. XIV. No. 4.

ARCHIVES OF OPHTHALMOLOGY.

DISTURBANCE OF THE COLOR-SENSE IN NEURITIS.

BY. DR. AUGSTEIN, OF BROMBERG, PRUSSIA.

(*See plate ix.*)

Translated by Dr. H. KNAPP.

THE examination of the periphery of the visual field in affections of the nervous apparatus of the eye proved to be of great importance so soon as the acquired color-blindness had received greater attention. When disturbances of the color-sense in atrophy of the optic nerve were extensively investigated by different authors (Leber, Galezowski, Schirmer, Schön, Treitel, and others), it was found that they were not limited to that affection alone, but played an important part also in others. Nevertheless, on perusing the literature on the subject, it is surprising to notice that in the inflammatory diseases of the optic nerve the color-sense has comparatively seldom been examined; if mentioned at all it has been in cases in which the inflammation was passing into atrophy. Apart from such cases, disturbances of the color-sense in neuritis are reported as being either insignificant or absent. If repeated examinations revealed the color-sense to be markedly disturbed, it was alleged that atrophy was on its way, or imminent.

The object of the following communication is to report on the extensive investigations we made during the last two years in the clinic of Dr. SCHNELLER, who was the first to direct our attention to the subject. All patients that presented disease of the background of the eye, were subjected

to the investigation of the visual field for color-perception. Thus I have before me four hundred charts of the visual color-field, half of which refer to patients with neuritis. When the neuritis was present on one side only, the examination of the healthy eye was never omitted, for the sake of comparison. The examinations were repeated at regular intervals.

I may be permitted briefly to describe our *method of examination.*

To have good light the examinations were made at noon-time, and on clear days only. The point of fixation was the centre of the arc of the perimeter; the yellow spot, consequently, corresponding to the centre of the field. As objects of examination dull-colored flower papers were used, namely, blue, yellow, red, and green, in squares of 1 *cm.*, pasted on black tablets. Yellow has, as far as I am aware, been used only in the first examinations by SCHÖN; afterwards it was dropped, on the supposition that it always is close to the limit of blue. It will be evident further on that we had good reason not to omit examining for yellow. That the size of the squares is of importance is now generally admitted, in spite of Woinow's previous statement to the contrary. To detect and map out central scotomas, even smaller squares than 1 *cm.* were required, down to 3, 2, and 1 *mm.* With these the patients' power of observation was not too highly taxed, for when one eye was sound, they at once recognized the color of these small squares; besides, the eyes of the examiner could always serve for comparison if the light was insufficient.

The tablets were moved from the periphery toward the centre. We began with a white square and notified the patient beforehand. He, expecting it, gave notice at the moment when the first bright shimmer struck his eye. When colored squares were used, the patient was not informed beforehand; he had to name the color as soon as he was able to recognize it, not waiting until it appeared fully. If we examine our own eyes we see with what certainty we are able to designate the point at which the approaching gray or white in which the color first appears

to the eye, turns at once into a distinctly recognizable color. Frequently I have obtained from repeated examinations the same results, yet it must be conceded that, at times, small variations may occur. In examining the upper part of the field, we always took care to raise the upper lid and draw the head back, in order to remove any impediment from the way of the incident rays of light. The influence of the nose during examinations of the inner part of the field was eliminated by slight turnings of the head. In spite of all precautions, even the physiological limits vary so much that, according to SCHÖN, a difference of 5°, even of 10°, cannot, under all circumstances, be considered as abnormal. Though examinations in the different stages of the disease and comparisons with the healthy eye give a certain value to differences of 10°, even of 5°, strict accuracy in this method is, as Schön also states, neither possible nor required.

Examination in four meridians seems to me sufficient in almost all cases. Looking over many color-field charts, in which more meridians are traced, we notice that, with rare exceptions, the additional meridians might have been left off without essentially changing the total tracings. In examining more than four meridans we do a superfluous work, which, bearing in mind the time of the physician and the fatigue of the patient, had better remain undone.

We must always remember that the physiological limits of the color-fields vary considerably in different persons, and are even influenced by accommodation and refraction. Hence the differences in the statements of authors—Aubert, Förster, Landolt, Schön, etc. *Yet I believe that we can designate a visual field as normal, when certain characteristic conditions are present,* which, from the investigations of others and my own experience, I desire to point out. Above all, the concentric arrangement and the normal succession of the color-limits appear of the greatest importance. Then it is to be noted that the color-blind zone which lies between the limit for white and that for blue has a breadth of about 10° ; close by the limit for blue lies the limit for yellow, both often merging into each other ; then follows the limit

for red; lastly, that for green, which has the smallest field. Investigations made in the manner described above have given me the following results:

	For white.	Blue.	Yellow.	Red.	Green.
Outward	90°	80°	Lies	65°	50°
" and up	70°	60°	close	45°	40°
Upward	50°	40°	by	33°	27°
" and in	55°	45°	blue.	30°	25°
Inward	60°	45°		30°	25°
" and down . . .	60°	50°		35°	27°
Downward	72°	58°		45°	30°
" and out . . .	85°	75°		55°	40°

The limits for red and green in the physiological state vary more than those for blue and yellow, and it is generally known that under pathological conditions they are first and most altered; next to this, as will be shown later, the limits for yellow, in many pathological conditions, are first changed. Yellow lying near blue in the healthy state, it will at once awaken suspicion to see it move toward and even beyond the limits of red and green. We must be more on our guard if we have to deal with a contraction of the limits for red and green; but from my experience I consider it to be pathological when in the upper, inner, and lower parts of the field the red limit sinks below 25°, the green limit below 20°; and in the outer part the red limit below 40°, the green limit below 30°. The personal variations of the extent of the color-fields have no bearing on a definite case when the other eye is healthy. Repeated examinations and the aid to be derived from a due appreciation of other symptoms are of great service in framing the diagnosis. *Reëntrant angles, even for one color, with normal outer limit, intermingling of the color-limits, destroying their normal succession and changing concentric curves into zigzag lines, must always be considered as pathological.* Apparently insignificant contractions in a certain direction, even of one color only, may justify the conclusion that the function of the conducting fibres is still disturbed.

I trust to be able to demonstrate these assertions by facts

found on examining patients; but before I begin to report cases, I desire to put the *chief results of our investigations* on record.

1. Every neuritis, let it end in atrophy or recovery, is accompanied by disturbance of the color-sense.

In both cases the degree of the disturbance may vary from total color-blindness to but slight limitations and irregularities of a single color. The duration of the disturbance varies in like manner.

2. The examination of the visual fields with pigment colors furnishes the surest data in estimating the course of a neuritis; sometimes it brings to light functional disturbances of the optic nerve when the ophthalmoscopic condition and the acuteness of central vision no longer show any abnormity; it is, therefore, the most delicate method of examination.

From many similar observations I select a case which during a long time characteristically showed the disturbances and improvements of the color-sense to its total restitution, even after a relapse.

Mr. G. Rohde, of S., æt. twenty-two years, called the first time Nov. 20, 1881, on account of impairment of sight in the right eye and pain in raising it. He is robust, of healthy appearance, free from syphilis, has never been ill, does not drink, smokes but little. Eight weeks previously, when lying in bivouac one night, his right side was drenched with rain. On awaking he experienced considerable pain in the right side of his head, which subsided, however, in a few days. Ten days ago he had pain on looking up, and alleges that then he first noticed the sight of the eye to be weak. L S almost $\frac{8}{8}$; R with + 1.5 and 1.0^c O° S = $\frac{2}{8}$—. Od very red, not prominent; its contours ill defined, arteries normal, veins slightly enlarged. No cerebral symptoms. The examination of the visual field shows normal conditions in the left eye—represented by fig. No. 1, plate ix.—; in the right—fig. No. 2—there was considerable contraction of all color-limits, with reëntrant angles. All colors are confined to a space of 30° in the vertical by 80° in the horizontal direction. Yellow is moved from the blue-limit to the inner side of red. No central scotoma. After inunction of mercurial ointment, abstraction of blood, etc., the vision improved rapidly, rising in twenty days to $\frac{7.5}{8}$. The contours of the od were

normal on the temporal, ill-defined on the nasal, side. The visual field now shows the condition represented in fig. No. 3; with S more than normal there are slight contractions of the outer limit, and very considerable contractions of all color-fields which partially intermingle, and are all indented. Yellow has enlarged, but does not yet reach the blue-limit. Three weeks later S was $\frac{4}{6}$ on either side. Both optic discs perfectly normal. The successive charts, taken at weekly intervals, show a gradual improvement of all abnormities. Jan. 26, '82, a perfectly normal chart—No. 4—was obtained. Three months later the patient complained again of impairment of sight in the right eye. The examination showed R E: S = $\frac{4}{6}$; od opaque, but well defined. For business reasons he declined treatment in the hospital. No sooner than July 10, '83—*i. e.*, after fifteen months, he came again, chiefly on account of pain in moving his right eye. S was $\frac{1}{10}$, od very opaque, margins well preserved, arteries normal, veins greatly dilated. He recognized no color with the right eye; all appeared lighter or darker gray. Abstraction of blood, July 13th, had no effect. Ordered: mercurial inunctions and 3.00 of iodide of potassium daily. Two days later he noticed himself that he could distinguish colors for the first time. July 16th S = $\frac{1}{6}$, and his visual field presented the tracings of fig. No. 5. The following charts, of July 21st with S = $\frac{4}{6}$, of July 25th with S = $\frac{5}{6}$, and of July 30th with S = $\frac{7}{6}$, showed a steady improvement. Central scotomas could never be found, not even with very small squares. The chart of July 30th was almost normal.

A similar series of charts in **rheumatic neuritis** refers to two ladies. Their histories resemble that of the previous case so closely, that I refrain from reproducing them. With them also the outer limit soon became normal, the color-fields, at first very much contracted, gradually enlarged, but had not yet reached the normal limits when S was = 1 or more. Yellow was reduced to the green-limit, occasionally with large central scotomas in both cases. In the one case (Mrs. F.), the first examination was made Nov. 22, '81, and only on Jan. 19, '82, the visual field showed normal limits, long after S and the ophthalmoscopic condition had become normal. Shortly after that time the other (right) eye had become affected. When it was examined, Feb. 7, '82, the left was examined likewise, and the renewed contractions of

the color-fields, as well as the presence of reëntrant angles, indicated the beginning of a relapse of the left-sided neuritis, though S was still good, and no subjective symptoms were present.

One example of inflammation of the optic nerve from cerebral causes, probably chronic meningitis (**descending neuritis**), was observed.

It is of special importance on account of its final recovery, though at first there was great functional derangement, and the duration of the affection was long.

Caroline Wiedom, æt. fifty-three, presented herself the first time Jan. 7, '82, complaining of impairment of sight in both eyes. She never had had any severe illness, and showed no signs of syphilis. During the last few months she had been subject to severe headache, dizziness in walking, nausea, and vomiting. No disorder of motility or sensibility. L H 3.5,[1] S = $\frac{6}{18}$. R E (?): S = $\frac{2}{60}$. Optic discs dull, but well defined on both sides. The visual field of the *left* eye shows slight contraction of the outer (white- or form-) limit, moderate for blue and yellow, very considerable for red, but particularly for green, which laterally is 12°, in other directions not over 10°. The field of the *right* eye is represented in figure No. 6. Contraction of the outer limit in every direction, most marked outward; of colors, blue and yellow alone are recognized, and they only in a sector extending 35° from the centre medially. Febr. 12th, S = $\frac{1}{24}$; the outer limit of Froider, color-limits the same, but in the inner-upper part, at the periphery, red is recognized in a zone between 5° and 25°, and green between 5° and 15°. March 15, 1882: S $\frac{1}{6}$, H 3.5, the color-field very little changed. Red and green have reached the centre; green is perceived in patches also in the lower, outer, and upper-outer parts at 40° and at 18°. The next chart, of June 27, '82, shows: S being = $\frac{5}{6}$, normal outer limits, a moderate contraction of all color-fields and reëntrant angles, most pronounced in green. The class entry, July 28, '82, shows, with H 3.5, and S = 1; limits equal to those of figure No. 4, consequently normal. Meanwhile the limits of the fields in the left eye have also gradually enlarged. July 28, '82, it showed normal fields, S = 1, H = 3.5. The

[1] When decimals are used in this and many other journals, without any specification, they refer to the metric system. In optical subjects they signify dioptries; in pharmaceutical, grams. The inch system will always be indicated by fractions, referring by preference to Paris inches; $\frac{1}{36}$ = 1.0 very nearly.—ED.

charts of this eye resemble greatly those of rheumatic neuritis, excepting the fact that yellow lay close by blue. Central scotomas never were found.

In a number of cases of **syphilitic neuritis,** we have made examinations of the visual field, and repeated them in the different stages of the disease. The color-fields closely resemble those in rheumatic neuritis ; we noticed in particular the same contraction of the yellow-limit, which often touched the green. Nos. 7 and 8 show the fields of Mrs. B. on Feb. 16, '81. Roseola had appeared some months previously, glandular swellings were still present. Both optic discs were slightly opaque, with somewhat ill-defined margins. M = 1.75 ; S = $\frac{5}{6}$ o. u. After mercurial inunctions, both visual fields showed, Jan. 9, '82, with S = 1, normal white-limits, whereas the green-limit was still slightly contracted and indented, toward the nose only slightly exceeding 20° ; the other colors had normal fields. April 16, '83, after the mercurial treatment had been discontinued, the visual acuteness was diminished (L S = $\frac{2}{81}$, R = $\frac{5.5}{6}$), and very considerable contraction of all color-fields, showing that a relapse had taken place, and confirming our supposition that in January the morbid process had not ceased altogether, for the color-sense then was still somewhat disturbed. The patient did not return.

How marked the derangement of the color-sense in this form of neuritis, despite the preservation of good sight, may be, is seen in figure No. 9, representing the visual field of Mrs. L. K.'s right eye on June 4, '83, when S was = $\frac{2}{5}$. Mrs. K. received hospital treatment from April 24 to June 4, 1883, for double syphilitic neuritis. On the day of her admittance both eyes were E. S L = $\frac{5}{6}$, R = $\frac{5.5}{24}$.

June 4, 1883, S > 1, and the visual field similar to No. 1. Further examinations showed R also a considerable enlargement of the color-limits ; they are, however, not yet normal, though S is almost 1. Patient is still under treatment.

In a fatal case of syphilis perniciosa with neuritis, it was the contraction of the color-fields that gave the first warning of the impending aggravation. The patient was admitted

with syphilitic neuritis, S = $\frac{1}{3}$. The color-fields, at first very narrow, soon enlarged, but did not become normal, whereas S gradually became = 1. Then, with good vision preserved, the color-field contracted again, foreshadowing the coming rapid decay of vision. The sector-like defect in the lower, inner part ushered in progressive amaurosis. The autopsy discovered total atrophy of the optic nerves.

Lastly, I desire to mention the disturbances of the color-sense which we have found in **retro-bulbar neuritis**, exclusive of cases of toxic amblyopia. The central color-scotomas characteristic of this form of neuritis were never missing, and chiefly supported the diagnosis. Our investigations do not confirm the statement of Leber[1] that "in pure cases of this affection the periphery of the visual field does not exhibit any derangement or contraction," if this assertion is meant to comprise the color-fields. We have noticed, it is true, that occasionally, where the central acuteness of vision was still greatly impaired and a large central scotoma was present, the peripheric limits in the course of recovery became almost suddenly normal, but this seemed to occur in the later stages of the affection, and to demonstrate that in this disease the repair of the morbid alteration takes a centripetal course, contrary to the other kinds of neuritis. Accordingly the limits for blue and red first became normal, next that for red, last that for green.

Leopold Lietz, æt. twenty-six years, presented himself for the first time Jan. 6, 1883, complaining, for three days, of considerable impairment of sight in his left eye. He saw movements of the hand only in the upper part of F, and with this eye recognized no color, however large the object. The od was opaque, ill-defined, particularly toward the temple. Jan. 15th, S had improved to counting fingers at 2 *m*. The visual field on that day is seen in figure No. 10. Limit for form, normal; blue is recognized in a tolerably broad, yet not normal, zone at the periphery, and yellow in a narrow peripheric zone. In the centre a large scotoma for white and all colors. Jan. 18th, the patient counts fingers at 4 *m.*; the white- and blue-limits are normal; the zone for yellow is broader at the periphery, but red and green are not recognized, and the

[1] Text-book in Graefe-Sämish, p. 830.

central scotoma is unchanged. Margins of od well visible again. Jan. 27th, S = $\frac{1}{3}$. White- and blue-limits normal, yellow and red almost normal, green is perceived in a small zone at 40° in the upper-outer part, and also near the centre, though with very considerable limitation. The scotoma has greatly changed; it is recognizable with the aid of colors only, and is confined to a circle of 8° around the point of fixation. Feb. 3d, S = $\frac{3}{6}$; all color-limits are normal, excepting a small indentation for red and green. The central color-scotoma begins to clear up from the centre. Red and green in small squares are recognized in the centre, but not in a paracentric zone between 3° and 8°. Feb. 13th, S = $\frac{4.5}{6}$; the patient, satisfied with the result obtained, left off coming.

Quite a similar observation was made in the case of Mr. F. Müller, Feb. 4, 1883. With S = $\frac{1}{30}$, the gradual reëstablishment of the color-perception began at the periphery, after total color-blindness previously. The central scotoma, at first for white and colors, then for colors only, contracted gradually, but was still recognizable in three months.

The disturbances of the color-sense having manifested themselves so distinctly in every form of neuritis as to consider this method of examination the most delicate of all, it suggested itself to us to employ it also in those dull-red optic discs that are so frequently observed as the consequence of accommodative asthenopia. Slight limitations of the color-fields may be regarded as physiological, but the following case shows that also marked pathological limitations may occur in this difficulty.

Karl Dreyer, æt. twenty-six years, presented himself Dec. 5, 1882. He had worked intensely and perseveringly for an examination, till at last the blurring of the letters and severe pain in the eyes made reading and writing impossible. With + 3.5 S was L = $\frac{6}{18}$, R = 1, and the near point corresponding to his age. With the OS the same degree of H was found. Both optic discs were dark-red, margins well defined, arteries normal, veins congested. The visual field of the right eye (fig. No. 11) taken on the same day, shows the outer limit normal, all color-fields greatly contracted, yet their concentrical arrangement well enough preserved. Yellow is even more contracted than green. The visual field of the other eye is quite analogous. Convex glasses, rest, and darkening of his room relieved the discomfort. As early as

Dec. 15, '82, all color-fields were wider and concentrically arranged; yet blue reached laterally only 60°; yellow had extended beyond the limit of green, but was still within the limit of red. The visual field of the other eye was very similar. The hyperæmia of the optic discs had decreased. March 4, 1885, all inconvenience was removed, the congestion of the discs had disappeared, the visual fields and color-perception were normal.

After I had made some similar observations in accommodative asthenopia and one in myopia (Miss S., M. = 6.0, o. u. Prolonged sewing had produced congestion of ods and disturbance of the color-sense), I saw the first—and, as far as I am aware, the only—literary allusion to the subject under consideration. SCHÖN, namely, supposes that such disturbances occur by excessive efforts of accommodation. He says: "We can expect a corresponding impairment of eccentric vision with concentric limitation of the visual field, —both to be accounted for by the pronounced hyperæmia of the papillæ which in this category of cases is never absent." If Schön cites, however, the cases described by STEFFAN[1] under the title of retinal anæsthesia, in support of his supposition, I cannot agree with him, for these affections are not the result of accommodative tension, but the anomalies of accommodation—spasm and paralysis—are only symptoms of general nervous debility.

I think I do not overestimate the value of the discovery of disturbances of the color-sense in accommodative asthenopia, if I find in it a clue to the explanation of the color-disorder in neuritis. We may justly assume that the color-disorder in accommodative asthenopia is caused by circulatory anomalies, producing hyperæmia of the optic nerve and consequent nutritive disturbance of the nerve fibres; for the color-disturbance sets in with the hyperæmia and disappears with it, and there are no inflammatory, much less degenerative, processes present. We may, therefore, conclude that also in neuritis nutritive disturbance will produce color-disorder, without the presence of degenerative or atrophic processes.

Comparing the visual fields in neuritis with those in

[1] *Klin. Mon.*, 1873, p. 402.

atrophy, the chief difference seems to be in the outer (white-) limit, which, in atrophy, is never normal, but gradually progressing, mostly by irregular indentations, whereas in neuritis it is, if at all, only slightly and concentrically narrowed, and soon turns normal again. No fundamental differences seem to exist in the kind of the chromatic disturbances: they always result from defective nutrition. If the causes are dilatory as in atrophy, color-blindness and amaurosis must be the consequence; if they are transient, complete or partial recovery will follow.

Color-disorder being, as we have seen, completely removed after having existed for months, its duration cannot, by itself, indicate atrophy; nor can the kind of the color-disorder indicate it, for the succession in which the single colors disappear and reappear is the same in benign neuritis as in atrophy. The alterations in the limit for yellow may, perhaps, prove a distinctive feature, for, according to our experience, it showed marked contractions in most cases of neuritis, and often faded away simultaneously with green, whereas, in many cases of progressive atrophy, the perception of yellow is preserved as long as that of blue.

THE ANTISEPTIC ACTION OF COCAINE, CORROSIVE SUBLIMATE, AND CHLORINE WATER UPON DACRYOCYSTITIC SECRETIONS TESTED BY INOCULATIONS OF THE CORNEA.

A CONTRIBUTION TO THE QUESTION OF DISINFECTION.

By Professor H. SCHMIDT-RIMPLER, Marburg, Germany.

Translated by A. Schapringer, M.D., New York.

IN the vast majority of cases of dacryocystoblennorrhœa the secretions of the sac have infectious properties, as has been proved by a series of inoculations of the corneæ of rabbits already published by me.[1] The inoculations produced intumescent infiltrations, and often purulent ulcers, with hypopyon and iritis.

I have made use of similar inoculations in order to test the disinfecting properties of a number of drugs, by first mixing them with the blennorrhoic secretion of the lachrymal sac, and then inoculating the cornea with this mixture. If disinfection had taken place, no purulent inflammation ensued. The severity of the inflammation following septic inoculation varies according to the quantity of matter introduced into the corneal wound, and the virulence of this matter, the virulence changing in different forms and stages of the disease. Occasionally the individual disposition of the animal experimented upon also seemed to exert some influence. After one has made a certain number of such experiments, it becomes an easy matter to decide in any

[1] Virchow's *Archiv f. path. Anat.*, Bd. lxx., 1877; Zehender's *Klin. Monatsbl. f. Augenheilk.*, April, 1877, and July, 1880.

one case whether the reaction is of a septic or an aseptic nature.

In regard to the question of the prevention of infectious purulent keratitis, these experimental inoculations are at least of the same importance as those experiments in which cultures of microphytes are treated with disinfecting substances in order to ascertain whether the microphytes will thereby be deprived of viability or not. Experiments of the latter description, and of a different and more general scope, have been made several years ago by Buchholtz, Wernich, and especially by Koch and his pupils.

Lately (1883), Sattler published the results of experiments in which he tested the viability in culture-gelatine of dacryocystitic micrococci and jequirity bacilli dried on silk threads and treated with antiseptic substances. He paid especial attention to the length of time required by the antiseptic substances to exert their influence. These experiments are open to the objection that nothing definite is known as yet about the clinical significance of these microphytes in the etiology of purulent inflammations of the cornea. Sattler himself observes that the pus of dacryocystoblennorrhœa "contains several species of micrococci, and we do not know which is virulent and which is not."

In my paper quoted above, and written before the method of staining the schizomycetes had been introduced, I described "single micrococci, micrococci in chains of two, three, or more links, and microbacteria" found in the pus of dacryocystoblennorrhœa. Subsequently I made renewed investigations in conjunction with Professor Schottelius using gentiana and Hoffman violet for staining purposes. In this way I discovered numerous bacilli arranged in small stellate groups, and presenting two different shapes. One form is small, stout, and composed of two roundish portions. Whether these are really diplococci, as is supposed by Widmack,[1] who pictured them in his drawings, I could not decide. The other form, not so numerous as the first, is longer and more slender, and is certainly a bacillus. It strikingly

[1] "Bakteriologiska studier öfver dacryocystit och ulcus serpens corneæ." Reprinted from *Nord. med. arkiv.*, Bd. xvi., No. 25.

resembles the tubercle bacillus, but is somewhat shorter, and does not retain the first aniline dye if a second is employed, as does the latter.

Widmack isolated the micrococci and diplococci which he found in the secretions under discussion, by cultivating them in blood serum from the ox, and then inoculated them into the cornea. Almost always keratitis ulcerosa and hypopyon followed. After I had informed Mr. Widmack of the results of my investigations, he also succeeded in finding the bacilli.

In spite of these interesting experiments, the question as to the pathogenic bacteria of dacryocystoblennorrhœa must still be considered an open one. The inferences drawn from the results of the action of antiseptic substances upon bacteria-cultures as to the efficiency of these substances in preventing purulent keratitis are only probable. Granted even that the micro-organisms mentioned above are the real source of infection, it must be borne in mind that the medium containing them is of great consequence. The investigations of Fischer and Proskauer[1] on disinfection, by means of chlorine and bromine, have shown that the degree of humidity of the micro-organisms is of great importance. Comparatively thick layers of micro-organisms could be rapidly and surely destroyed by chlorine, provided they were moist by nature, or had been moistened by suitable treatment.

In his investigations, Sattler employed only dried cultures of bacteria, and his conclusions therefore cannot be made to apply to the liquid secretions of the lachrymal sac, or to other organisms contained in the moisture of the conjunctival cul-de-sac. Fischer and Proskauer, on the contrary, were right in using tuberculous sputum for their experiments, and not the isolated tubercle bacillus, notwithstanding the fact that in this case the infectious character of the bacillus is well established. They lay special stress upon the necessity of attacking the micro-organisms in the same medium in which they naturally occur.

[1] Ueber die Desinfection mit Chlor. und Brom. Mittheilungen aus dem K. Gesundheitsamt, Bd. ii., p. 228, 1884.

For this reason I attribute special importance in the question of disinfection to experiments made with dacryocystitic pus itself. It is a well-established fact, and one that can be often verified by clinical observation that the secretion of dacryocystoblennorrhœa is capable of infecting corneal wounds, but it will be seriously doubted whether *dried* dacryocystitic micrococci or jequirity-bacilli ever cause such a complication unless they are inoculated for experimental purposes. The supposition that disinfectants will affect the dry spores suspended in the air, which are said to cause suppuration in the cornea after operations, in the same way as they affect these cultures, may be true, but it wants corroboration, especially since investigations with such recognized pathogenic micro-organisms as those of anthrax, tuberculosis, and erysipelas have proved a great difference to exist between the behavior of cultures and of dry spores towards disinfectants.

Experiments conducted with the pus of dacryocystoblennorrhœa, therefore, should be recognized as of scientific value, for the present at least, as long as they afford information about a substance practically known as a source of infection.

Since cocaine has come into such general use in the operations upon the eye, I have deemed it suitable to include it among the substances experimented with, in order to ascertain if it had any antiseptic qualities, and especially the salicylate of cocaine. Besides this I experimented with corrosive sublimate in solution, and repeated the experiments with chlorine water, which I have already published. I made, all in all, forty-eight inoculations. The method pursued was the same as before, with the difference, however, that I made a note of the length of time the secretions remained in contact with the disinfecting substances. The secretions were thoroughly stirred, and mixed with the disinfecting fluids.

The muriate, as well as the salicylate, of cocaine (Merck's) were used in solutions of four per cent. There was no perceptible difference in the action of the two preparations. The secretions coagulated in them into small balls. Their

infectious nature remained unimpaired after lying in the cocaine solution for from one to three minutes. After ten minutes they still produced well-marked septic inflammation.

EXPERIMENTS.—*Jan.* 10, 1885.—Small gray rabbit. *Right* cornea inoculated with muco-purulent matter from a profusely secreting case of dacryocystoblennorrhœa, which had been kept in a solution of muriate of cocaine for ten minutes, and had been thoroughly mixed.

Jan. 11th.—Grayish-white infiltration at the point of inoculation, with a shred of mucus adhering to it. Chemosis of the conjunctiva. Iris discolored. Pupil contracted.

Jan. 12th.—Gray cheesy infiltration, slightly intumescent. Well-marked conjunctivitis with œdema. Slight yellowish-gray opacity of lower anterior quadrant of cornea. Pupil contracted. Decidedly septic inflammation.

The infectious character of the secretions seemed to be mitigated somewhat by treatment of ten minutes' duration. That this was not the result of the action of the water merely was proved by experiments in which pus treated with distilled water and with cocaine solution were compared.

Jan. 26, 1885.—Yellowish rabbit. *Right* cornea inoculated with dacryocystitic pus having lain in distilled water for from eight to nine minutes. *Left* cornea inoculated with same pus having lain in cocaine solution for from seven to eight minutes.

Jan. 27th.—Right eye: Thick cheesy infiltration of the cornea surrounded by diffuse opacity; pupil contracted; iritis. *Left* eye: Intumescent white corneal infiltration not so large as on right side; pupil medium-sized; slight conjunctivitis.

Jan. 29th.—Right eye: Cheesy whitish infiltration and diffuse slight opacity of cornea; pupil contracted. *Left* eye: Yellowish infiltration and slight opacity of cornea; inflammation somewhat less than on right side.

It follows from these experiments that cocaine solutions of the strength of four per cent. somewhat mitigate the virulent character of blennorrhoic secretions of the sac, but they do not act as disinfectants in the strict sense of the term.

I have made similar experiments with a solution of corrosive sublimate of the strength of 1 to 5,000, which is now generally used as a disinfectant in ophthalmic surgery. Immersion of three minutes' duration was usually not sufficient for the complete destruction of the infectious properties of the matter, from five to ten minutes being required. The following are examples of experiments performed with highly infectious material:

I. *Feb.* 9, 1885.—Large gray rabbit. *Left* eye inoculated with yellowish dacryocystitic pus which had lain in sublimate solution for two or three minutes. *Right* eye inoculated with pus of the same source which had been treated with a four-per-cent. solution of salicylate of cocaine for four or five minutes.

Feb. 10*th*.—*Left* eye: Yellowish, purulent, intumescent infiltration surrounded by a hazy zone; pupil contracted; partial œdema of conjunctiva; muco-pus in conjunctival sac. *Right* eye: Cheesy infiltration, swollen especially at the margin; diffuse, moderate opacity of the cornea; pupil contracted; œdema of conjunctiva; conjunctival secretion increased. (No marked difference from left eye.)

Feb. 11*th*.—About the same as on the day previous. The infiltration of the left cornea somewhat less then that of the right.

II. *Feb.* 9, 1885.—Large gray rabbit. *Left* cornea inoculated with the same material as in I., but after having been immersed in sublimate solution for six minutes. *Right* cornea inoculated with the same matter treated with a four-per-cent. solution of cocaine salicylate for the space of eight minutes.

Feb. 10*th*.—*Left* eye: Slight abrasion of the cornea at the point of inoculation, with some haziness at the margin only; pupil of medium size; no conjunctivitis. (No infection.) *Right* eye: Yellowish, swollen, cheesy-looking infiltration of cornea, surrounded by diffuse opacity; iritis; marked conjunctivitis and œdema.

Feb. 11*th*.—*Left* eye almost entirely free from inflammation. *Right* eye the same as yesterday.

My previous experiments had already demonstrated the remarkable disinfecting power of chlorine water, and I have recommended it as the most practical disinfectant for eye-surgery. Additional experiments have proved that it surpasses the sublimate solution treated of above in quickness

of action. This coincides with the results obtained by Sattler, in his experiments with cultures of microphytes as well as those obtained by Fischer and Proskauer, from their diligent and carefully conducted researches. "The micro-organisms are rapidly and surely disinfected by chlorine, even in comparatively thick layers, if they are moist by nature or have been moistened by adequate treatment. Disinfection is completed most rapidly if chlorine suspended in an atmosphere saturated with moisture is made to act upon moist objects."

Even spores of the bacillus of anthrax, which are endowed with an exceptional power of resistance, become disinfected within three hours if treated with very moist air containing 0.32 to 0.18 per cent. of its volume of chlorine gas. The *aqua chlori* of the German pharmacopœia ought to contain 0.4 per cent. of chlorine.[1] The apothecaries usually keep it in dark bottles in the cellar. In order to neutralize the inevitable loss by evaporation, it is usually made to contain more than the standard quantity of chlorine gas at first. *This chlorine water is well borne by the eye, and therefore is superior to sublimate solution,* which even in the low strength of 1 to 5,000 will in some cases cause conjunctivitis. If this solution be used to irrigate the eye for some time, as, for instance, during an operation, the result in almost every case will be increased conjunctival secretion. Therefore, since chlorine water, as the experiments have shown, surpasses the sublimate solution of the customary strength in disinfecting power, it must be regarded as the best disinfecting substance for the eye. I now use it at every operation, first washing the lids with it and then irrigating the globe and the conjunctival sac. If the instruments and the hands of the operator are clean and the conjunctival sac is irrigated once more after the completion of the operation, every thing will have been done to secure aseptic healing. Affections of the tear-passages must of course be cured or made innocuous beforehand.

There is one drawback to the employment of chlorine water, viz., the fact that chlorine gas has a tendency to

[1] The same as that of the U. S. Pharmacopœia.—*Translator.*

combine with hydrogen and form hydrochloric acid. But if the preparation is kept in dark bottles and in a cool place, the formation of acid is so insignificant that practically it can be disregarded altogether. I had some chlorine water analyzed which had been standing in my Klinik for four weeks, and from which small portions had been taken from time to time. It still contained 0.23 per cent. of free chlorine and a smaller quantity of hydrochloric acid. This saturation has still sufficient disinfecting power. If *aqua chlori* be procured fresh every week, and its strength tested once in a while by smelling of it, it will be found the mildest and at the same time the most efficient disinfectant for practical use in ophthalmic surgery.

THE SECOND SERIES OF ONE HUNDRED CASES OF EYE DISEASE TREATED WITH THE GALVANO-CAUTERY.

By Dr. A. NIEDEN, Bochum, Prussia.

Translated by Dr. J. B. McMahon, New York.

AFTER an interval of scarcely half a year, I present the report of the second series of one hundred cases of corneal affections treated with the galvano-cautery; a proof at once that I have had full opportunity to test thoroughly the method, its value, and its range of applicability, and that it has again done me such excellent service as to force me to its further recommendation.

The numerous communications of which I am in receipt show that the method has obtained an extended trial in other hands than my own, and has had its importance generally recognized. The unfavorable judgment expressed by Michel in his text-book[1] can scarcely rest upon a sufficiently extensive personal experience.

The statement there made with regard to the "want of certainty in judging of the depth of action of the galvano-cautery," I would simply reverse. In this respect, I have already[2] taken occasion to comment upon the special advantages of the method of which a short experience will convince any one who has at his command the proper weapon, a suitable galvano-cautery.

A second objection is offered—the possibility of the reappearance of parasitic elements in the burnt tissue and

[1] Michel: "Text-Book of Eye Diseases," p. 276.

[2] Nieden: *Centralbl. f. Augenheilk.*, Bd. viii., p. 375.

their further growth. No other answer is needed to this than the fact now universally admitted, that the development of spores becomes impossible on sterilized soil, and as such we have every reason to regard an ulcer treated with the galvano-cautery.

We must, of course, assume first that the slight operation has been properly and thoroughly done, as a partial destruction of the parasitic elements occupying the ulcer will certainly not prevent the development of those which have escaped.

Experience here, too, proves the best teacher, as is shown by the present second series of cases; for I am now rarely obliged to resort to the use of the heated loop a second or third time in order to put a stop to the progress of the disease.

The reason is this, I cauterize more thoroughly at the first sitting, and am now better able to judge how much of the tissue is infected and must be sacrificed so as to leave untouched no morbific elements which would require in two days a repetition of the operation. Such repeated operations are necessitated not by the intrusion of parasites into the burnt portion of the tissues, but by the development of such as had previously existed in the neighboring tissues and had escaped destruction, as is shown in the case of any rodent ulcer of the cornea.

The introduction of cocaine has had a not insignificant influence on the success of the operation, by facilitating its performance and admitting of a more delicate manipulation as in penetrating into the different individual tissue-layers. To this influence I have already[1] called attention, as have also A. von Eversbusch[2] and Schweigger.[3]

The introduction of local anæsthesia has done away with the unpleasant features which were connected with the use of the galvano-cautery, such as the cauterization of a stripe of healthy corneal epithelium from an inadvertent movement of the patient on the approach of the heated loop or a

---

[1] *Centralbl. f. Augenheilk.*, Bd. viii., page 374.

[2] *Aerztl. Intelligenzbl.*, Bavaria, 1885, p. 6.

[3] *Berliner klin. Wochenschr.*, 1885, p. 49.

sudden turn of the globe under the fixing fingers on the application of the heat; again it was sometimes necessary to suspend the operation too soon.

A few minutes after the application of two drops of a three-per-cent. solution, there is a spontaneous widening of the palpebral fissure, which materially assists in the manual fixation of the lids; the anæsthesia of the corneal layers is so complete that neither the approach of the red-hot loop, nor its repeated application (which is accompanied with considerable hissing), nor the penetration of the entire depth of the corneal substance, causes any painful sensation.

Almost all patients, including children, bear the operation quietly, and I generally do it under the pretence of being obliged to remove a foreign body clinging to the eye.

What I consider the chief advantage of cocaine in this connection, is this, that it enables us to proceed with the destruction of the tissues slowly and layer after layer, pressing the point of the instrument against the diseased surface momentarily, and inspecting the parts rapidly before repeating the process.

Instead of destroying, as was formerly done, as much tissue as possible by a single firm application of the point, I touch lightly and rapidly one or more times the whole surface of the ulcer. After this surface cauterization, I quickly note the color and form of the deeper structures, by lateral illumination, if possible, and if it seem necessary, now carry the incandescent loop through them, even as far as Descemet's membrane.

Especially in the characteristic form of serpent ulcer is it advisable after the cauterization of the upper layers to employ the process over the entire extent of the infected border-zone. In rodent ulcers also, the point of the instrument must be used to destroy deeply the separate, visible infiltrations lying near the edge of the ulcer.

At times it becomes necessary to penetrate the floor of the ulcer on account of the threatened perforation of the thinned wall, consisting only of Descemet's membrane, or the existence of a considerable, very fluid hypopyon, the evacuation of which would promise a more rapid cure, or the develop-

ment of increased intra-ocular pressure and diminished osmotic power of the cornea. Under these circumstances, the point of the loop heated to a brighter glow than usual is pressed quickly and firmly into the ulcer, the instrument being carefully balanced on its fulcrum so as to allow of the prompt withdrawal of the point as soon as the aqueous shoots in a small stream through the perforation; or, if the floor of the ulcer consists only of the tender Descemet's membrane, the flat surface of the loop is applied tangentially to the part, and so all danger of injuring the deeper parts is absolutely avoided.

In two cases of infiltration, resulting from traumatism, with infection and involving the whole depth of the corneal tissue, where it appeared necessary to destroy all the infected tissue at a single sitting without injuring the surrounding healthy tissue by the formation of a crater-shaped opening, I was able by a firm and rapid pressure of the point to pierce the whole thickness of the cornea, the exit of the aqueous humor showing that the anterior chamber had been entered, and to withdraw it immediately, whilst the perforation at the same time closed, and so the greater part of the aqueous was retained.

This method of opening the anterior chamber, as demanding a certain steadiness of hand and immobility of the eyeball, although in itself an easy procedure, could not well be done without the use of cocaine; indeed, without it I would not expose patients to the risk of thus injuring the deeper parts, but would resort to the destruction of the tissue in layers, and finally enter the anterior chamber by the usual method already described, and which I consider the proper one in the majority of cases.

Although the pain is not felt at the time on account of the local anæsthesia, and the patient is scarcely aware that an operation has been done on his eyes, after fifteen to twenty minutes a painful sensation (and, it seems to me, in a more marked degree) is noticed, which, as a rule, disappears rapidly and for good. It is described as like a burning in the eye, the presence of a foreign body or ciliary and supraorbital neuralgias.

As a great advantage of the cocaine, I would finally allude to its cumulative influence in causing the more rapid dilatation of the pupil after previous atropinization, in most cases of so-called hypopyon keratitis which call for the use of the galvano-cautery.

The affections were of about the same character as those already described in my first publication on the subject. Most cases were infected forms of ulcer, including the first stage of the disease, infiltrations of the corneal tissue, in which a destruction of the infected parts—in other words, a sterilization of the site of the ulcer—is the first condition of the cure. Eighty-five cases were corneal ulcers with marked tendency to involve the neighboring parts. Of these fourteen belonged to the class of serpent ulcers with the characteristic, crescentic, mostly swollen ring of infiltration. In sixty-three cases (seventy-five per cent.) pus in greater or less quantity was to be found in the anterior chamber; in twenty the process had not yet advanced so far.

Here, again, it is plain that the expression "hypopyon ulcer" does not describe the characteristic quality of any kind of ulcer. To consider the presence or absence of hypopyon as determining the character, is as if a division of ulcers were based upon their position in the cornea.

It cannot be denied that individual systemic conditions have a decided influence in this regard, as a much greater tendency to exudation and suppuration may exist in one patient than in another.

The existence of hypopyon is of no greater importance as an indication for treatment. While the character of the floor of the ulcer, its dirty gray color, its irregular surface as seen through a lens, the diffuse or localized infiltrations developing in the neighboring tissues, the marked symptoms of irritation, and possibly, also, the genesis of the process, show its infectious nature, the treatment has but a single aim—to separate, as rapidly and thoroughly as possible, the parts already involved from the yet healthy tissues, and so avert the extension of the infection. The application of the galvano-caustic, incandescent loop accomplishes this in the simplest way.

The healthy tissue is thus allowed to start the reactive processes of complete separation of the dead tissue and later restoration of the destroyed parts.

Sämisch's incision was the first advance in this kind of ocular therapeutics, so closely allied to the corresponding measures in general surgical practice; the galvano-cautery acts on the same principle, and, in my view, carries it out more fully.

The opening of the anterior chamber by means of incision was resorted to but twice in the last one hundred cases; in these the hypopyon was so extensive, and the coagulated contents so firm, that their disintegration and absorption would have been a process of too long duration, far exceeding the time required for the healing of the corneal ulcer.

An early evacuation of the anterior chamber by operation is not necessary, as experience shows that, after the sterilization and clearing up of the surface of the ulcer, the absorption of the pus proceeds with astonishing rapidity.

More than half the second series of corneal affections treated with the galvano-cautery (fifty-eight cases) were the result of traumatism; the ulcers produced by cold foreign bodies (*i. e.*, those not heated to a glow) decidedly outnumber those corneal lesions caused by metal in a fluid or glowing condition.

These latter, especially particles of iron or steel struck with the hammer from white- or red-hot blocks of metal in forging, cause at first, it is true, a graver and more extensive injury of the affected part. But the foreign body is soon removed, the underlying so-called ring of rust, consisting really of oxide of iron and burnt tissue, separates, often in two or three layers, so that only the base of the injured spot remains, appearing as a brown pigmented spot with gray border. The parts involved show little tendency to suppuration or to further purulent infiltration of the neighboring parts. On the other hand, if left to itself, the brown pigmented spot disappears very slowly, and the process of repair is equally tedious, though moist, warm applications used for several days hasten it.

In order to expedite the cure, but not, as above explained,

to save the tissues from purulent disintegration, which, under these circumstances, is rarely to be feared, I have repeatedly used the galvano-caustic loop after the removal of the foreign body. The ring of burnt tissue, composed of one or more layers, and the pigmented underlying tissue, are completely removed by a single application of the cautery, leaving a clean surface behind.

The results in these cases, with reference to the extent and density of the macula, are so much better under my present mode of treatment, that I can recommend the galvano-cautery in these also, as far preferable to other means.

There the method claims attention, because the cure is more rapid and the termination more favorable.

As a not uninteresting contribution to the study of injuries of the eye, we may note the observation that lesions due to flying bits of boiler-incrustations, which are generally composed of nitrates, and which, forming a deposit on the inside of boilers, require to be chiselled off, lead, almost without exception, to the formation of the pernicious forms of corneal ulcer. I do not think that the chemical composition of the foreign body has all to do in those cases with the marked tendency to ulcerative destruction of the corneal tissue. We must take into consideration the fact that the workmen, immediately after the emptying of the boiler, must pursue their work in this overheated place, in a profuse perspiration, and so all the conditions favoring the development of infectious processes are present, even to the want of protection of the eyes from the sweat.

In my first series of observations, dacryocystoblennorrhœa showed as a complication in the relatively small number of six cases; in twelve cases of the second hundred, however, was noted the presence of infectious pus in the tear sac.

In this series, too, it is sufficiently proved that the starting point of the ulcerative process has generally been a traumatic lesion of the corneal epithelium, as a rule, of a trivial character.

It was also characteristic that both the cases of rodent ulcer were complicated with suppuration of the lachrymal

sac, and, further, that, in two other cases, in which, although this complication was absent, the tear duct was rendered impassable by lupous degeneration of the mucous membrane, pernicious ulcerative processes of the cornea with hypopyon called for the use of the cautery.

Although no lupous affection of the conjunctiva, or of the lachrymal sac could be demonstrated, it is fair to suppose the existence of an etiological connection between the lupous growth involving the lower part of the tear duct and the corneal disease, which presented all the characteristics of an infectious process. The success of the treatment was as well marked as in the other cases, the cure taking, however, about one third longer time. This same delay is noticed also in those ulcers occurring in scrofulous subjects, with deep, crater-shaped edges, and muco-fibrinous secretion, which generally extend through the entire thickness of the cornea and terminate in perforation. The use of the galvano-caustic methods here, too, causes a more rapid cleansing and separation of the diseased from the healthy parts. But it must be employed with more than ordinary caution, the loop being heated to a dull red only, on account of the diminished power of resistance in the tissues.

As we have to deal with the general cachectic condition of the patient, and a correspondingly unsound state of the parts adjoining the ulcer, the reaction is slow, the healing process not so active as in the case of an ulcer, pernicious, indeed, in itself, but arising as the result of an infectious virus in otherwise healthy corneal substance. In such cases we can not dispense with the simultaneous use of such therapeutic aids as moist heat, tonics, etc.

For the sake of experiment I employed the cautery in two cases which I might describe as a peculiar form of corneal sclerosis (sclerosirende keratitis). There is a peculiar development of hypertrophic strands of connective tissue which pass over the cornea, irregularly involve the entire thickness of the cornea in tortuosities, almost corresponding to those of the corneal lymphatic system, often project above the surrounding parts, are of milk-white color, and so offer a marked contrast to the transparent, healthy

corneal substance. There is increased vascularity only in the region of the limbus conjunctivæ; a few leashes of vessels follow some of the connective-tissue bands as far as the centre of the cornea.

The conjunctiva shows a certain degree of xerosis, but no trachomatous degeneration. Vision is correspondingly impaired. The patients complain of occasional severe attacks of ciliary neuralgia, which seems due to rheumatic influences.

I have seen the above-described affection three times in some 52,000 patients; the patients were miners and in each case but a single eye was affected. The disease has little in common with the picture of diffuse sclerosis of the cornea, and yet in its invasion and course the two are very similar.

As in these cases all treatment proved useless, I thought it possible, after the analogy of other observations, to limit to a considerable extent the opacity of the cornea by the galvano-caustic destruction of the connective-tissue formations, and so preserve the yet transparent parts of cornea with the result of improvement of the vision. Accordingly I used the heated loop to destroy some of the tortuous strands, in doing which I was obliged to penetrate to the inner layers of the cornea.

The manipulation is easily executed with complete preservation of the transparent tissue; yet I did not dare wander far from the nutrient border of the membrane toward the centre on account of the lowered nutritive power of the cornea.

My fears were justified. Although the diseased tissue could be destroyed without endangering the healthy portion of the cornea, the reaction processes of repair proved so interminably slow and the vascularization of the edge of the cornea showed only after so long a period of time, that I desisted from operative interference with the centre of the cornea, the part of most importance for optical purposes.

In general, it may be asserted that ulcerative processes of the cornea which are accompanied, in their healing, by the formation of vessels springing from the corneal margin, and which, as it were, need these vessels for their cure, do not

present the forms of purulent corneal infiltration or ulcer best suited for treatment with the galvano-cautery.

This holds true also for the forms of malignant phlyctenular keratitis which extend from the margin to the centre of the cornea, with a dense, broad leash of vessels, having at its apex a wide, grayish-yellow, elevated patch of infiltrated tissue. The condition is accompanied by ciliary neuralgia and violent irritation of the eye; it occurs mostly in patients of a scrofulous constitution and often progresses steadily in spite of all treatment.

By the destruction of the advancing infiltration, the galvano-cautery, in these cases, too, brings about a cessation of the ulcerative process, and so satisfies the first condition for the cure. But the completion of the reparative process is slow, the separation of the burnt tissue requires considerable time, the restoration of the loss of substance is not so perfect as we have occasion to observe in the worst forms of ulcers arising directly from infection.

The case is otherwise in the forms of pustular conjunctivitis, which, as is well known, occupy broad patches of the scleral conjunctiva near the corneal margin. They have generally destroyed to a greater or less extent the epithelial layer of the conjunctiva, and are covered with necrotic, light yellow, disintegrated masses of tissue or, in their later stages, with fungous granulations, easily destroyed on pressure. They offer considerable resistance to the irritant methods of treatment, whether with the red precipitate ointment, calomel insufflations, or the like. They show a decided tendency to involve the adjoining corneal tissue in an ulcerative process, confined to the margin, which can be regarded as a trophic disturbance of these parts, and for this reason demands the most energetic interference to terminate the primary disease. This is best accomplished with the galvano-caustic loop by furrowing the entire surface of the ulcer and by piercing the separate granulation masses. In a few days the floor of the pustule is freed from the necrotic masses attached to it, the conjunctival epithelium rapidly spreads over the affected parts, from the edges, and the normal nutrition of the adjoining corneal tissue again proceeds unimpaired.

If a marginal ulcer has already formed, it is treated with the galvano-cautery in the manner already described. I prefer to make a small perforation early in the progress of the disease rather than wait for a spontaneous opening, and so obtain a more rapid and satisfactory cure with only a trifling irregularity of the pupil at the point of perforation.

As most of these forms of disease occur in scrofulous patients, the local treatment must evidently be supplemented as much as possible, with tonic treatment directed to the general systemic condition of the patient. My observations include five such in the last series of one hundred cases.

In the treatment of acute trachoma of the conjunctiva, I have adopted the usual method for one eye of each patient, and for the other the destruction of the separate visible trachoma granules by the galvano-cautery. From the nature of the experiment I have not yet been able to conclude my observations on the value and possible advantages of the new method. The results I hope to be able to communicate later.

In destroying small tumors of the lids, especially teleangiectasia of the skin, I decidedly prefer the use of electrolysis, or the Paquelin cautery, as the quantity of blood in the tissues by cooling the loop of the galvano-cautery too fast prevents an extensive application.

I believe that in these observations I have covered almost all that district of eye diseases in which the employment of the galvano-cautery seems appropriate. It remains now to sum up the results of the treatment. In the introduction to this article, I stated that I had nothing to retract of the favorable opinions expressed in my first article on this subject, but, on the contrary, had obtained equally good results in my further experience with the second series, provided the method was employed in suitable cases.

This second series presented to me rather a field for investigating to what extent the method possessed value, and whether success could be obtained by the galvano-cautery in obstinate affections defying all other therapeutic means. In spite of this, I have not yet to report a single case of loss of the eye from anterior or total phthisis.

Of the 85 more or less severe corneal affections, including abscesses, superficial and deep ulcers, with or without hypopyon, serpent and rodent (3) ulcers, 75 (= 88.2 %), were cured, leaving an opacity (which we commonly designate as macula), but which has the advantages of limited extent, and of greater transparency over those which follow losses of substance that heal through suppuration.

In ten cases extensive opacities, the so-called leucomata, remained; in two of these a supplementary iridectomy inward was necessary, on account of their central position and their size. In ninety-three cases a single thorough application of the incandescent loop sufficed to terminate the destructive process; in four cases a second application was rendered necessary by the continued extension of the zone of infiltration; in three cases the procedure had to be repeated four to six times, often at intervals of some days, on account of oft-recurring foci of propagation before the desired sterilization was attained.

Cocaine was used in all cases treated during the last half year, but I did not find it equally efficacious in every individual,—a fact which has already received attention in several quarters.

In conclusion, I take the liberty to make this practical suggestion: Do not use too many elements to arm the instrument—certainly not a galvano-caustic battery. In addition to the danger of destroying the loop by melting, we must remember that there is no absolute need of radiation in white heat; indeed, this is a disadvantage in doing delicate work, on account of the marked dazzling. A single powerful element, whose plates can be immersed into the liquid to a greater or less extent, according to the freshness of the liquid, or the effect desired, is fully sufficient to bring the platinum wire to a red heat. In cautious operations on the deep parts, I have the loop heated to a dull red, and so attain my end more slowly but more surely.

Such, in short, are the results of my observations. I hope they will receive further confirmation by the practical employment of the method in the hands of my colleagues.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FIRST QUARTER OF THE YEAR 1885.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE COÖPERATION OF

C. E. Fitzgerald, Dublin; E. Marckwort, Antwerp; P. v. Mittelstädt, Brussels; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

1. Bunge. The new ophthalmic clinic at the University of Halle, a. d. S. *Klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 18.

2. Fuchs. The causes and the prevention of blindness. Prize Essay. Wiesbaden, 1885.

3. Gelpi y Jafre. Tratado iconográfico de las enfermades externas del órgano de la visión. Barcelona, 1885. 20 plates with 108 chromo-lithographs. Price 100 Mk.

4. Schmidt-Rimpler. Ophthalmology and ophthalmoscopy, for physicians and students. Wreden's collection of short medical text-books, vol. x. Braunschweig, 1885, 8vo, 628 pp. With 168 wood-cuts and a colored plate. 14 Mk., 50 pp.

The new ophthalmic clinic at Halle, a. d. S. (1), was opened April 1st; for the present it can accommodate forty-five patients.

All the rooms are heated from a central station. The heat generated there is also used for ventilating all the buildings connected with the clinic: the hot air rising through iron chimneys enclosed in a tower 40 *m.* high and 5 *m.* wide draws the impure air from every room of all the buildings, through a system of channels communicating with them.

FUCHS (2) has made no investigations of his own, but has drawn his conclusions from a comparison of those of other authors especially those of the Reviewer. He has evidently devoted most attention to the prevention of blindness, and judged from this point of view the book is an excellent one. Those chapters are particularly good which treat of blindness caused by diseases which, to a great extent, are preventable—for instance, trachoma and blennorrhœa. The geography of blindness, like all other chapters which are not of much hygienic importance, is treated very briefly. The prize having been awarded by the Society for the Prevention of Blindness, a society whose aims are essentially practical, their choice must be regarded as eminently proper.

GELPI Y JAFRE (3) has attempted to illustrate the external affections of the eye on a great scale, the first attempt since the time of Desmours, Ammon, and Rüte. The atlas shows evidence of marked scientific and artistic ability, but it is doubtful whether its practical value is equivalent to the trouble and expense of preparing it.

SCHMIDT-RIMPLER'S (4) book has been very well received. Its language is concise, the description of diseases lucid and based on observations of his own. The book is well adapted both for self-instruction and academic teaching, and will certainly meet with general approval.

b.—STATISTICAL PAPERS.

5. v. HÄRING. Report on twenty-five years of the private Ophthalmic Institute at Ludwigsburg. Stuttgart, 1885.

6. MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY. Fifty-ninth annual report for the year 1884. Boston, 1885.

7. NEW YORK OPHTHALMIC AND AURAL INSTITUTE. Fifteenth report (for nine months). New York, 1884.

8. SCHREIBER. Second annual report from Jan. 1 to Dec. 31, 1884. Magdeburg, 1885.

9. OSTROWSKY. Short report on 147 operations on the eye. *Wjestnik ophth.*, March, April, 1885. The operations were per-

formed at Tobolsk (Siberia). 46 extractions of senile cataracts; among these in 3 cases panophthalmitis; in 1, iritis; 15 iridectomies; 74 entropium operations (2 according to Snellen, the remainder according to Crampton); 1 extirpation of sarcoma of the orbit; 1 echinococcus of the orbit.

10. WICHERKIEWICZ. Seventh annual report for the year 1884 of the Ophthalmic Institute for the Poor at Posen. Posen, 1885.

11. WIESBADEN. Twenty-ninth annual report for 1884 of the Ophthalmic Institute for the Poor at Wiesbaden. Wiesbaden, 1885.

HÄRING (5) treated 24,899 patients; 820 extractions were performed, 357 of them according to Graefe, 32 according to Jacobson, 13 according to Mooren, 3 according to Beer, 2 according to Jaeger, 3 according to Wecker; 157 flap-extractions, the last in 1866–67. Whole number of operations performed 2,019. The loss in extractions according to Graefe amounted to 9.5 per cent. during the 25 years.

In BOSTON (6) 8,097 patients were treated; 95 extractions according to Graefe are reported in detail, 3 total losses, 3 moderate results, 8 cases which can be improved by another operation; 8 cases could not read.

At the NEW YORK OPHTHALMIC AND AURAL INSTITUTE (7) 4,695 new eye-patients were treated and 367 operations performed; among these 36 extractions according to Graefe, 31 good, 4 moderate results, 1 failure.

SCHREIBER (8) treated 1,571 patients. The lachrymal sac was extirpated in 12 cases; exenteration of the globe was performed in 3 cases.

WICHERKIEWICZ (10) treated 3,369 patients; 323 operations, among them 36 extractions of senile cataract according to Graefe, 35 with good, one with moderate result; 3 successful extractions of cataract within the capsule; 5 cases of detachment of the retina were operated, 3 of which were successful, 2 moderately so, and 1 a failure.

In WIESBADEN (11) 2,119 patients were treated, 435 operations; 26 senile cataracts were extracted within the capsule, 24 with good, 2 with moderate result.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

12. ARLT. Development of congenital microphthalmus and anophthalmus. *Anzeiger der K. K. Gesellsch. d. Aerzte in Wien*, Feb. 12, 1885.

13. GAYET et MASSON. Essai sur l'atrophie du globe oculaire, *Clinique ophth. de la Faculté de Lyon. Arch. d'ophth.*, vol. v., 2. March, April, 1885.

14. MASSE. Étude sur la transplantation des tissus dans l'organisme. *Gaz. des sci. med. de Bordeaux*, 1884, p. 608.

15. TREITEL. On central positive scotoma and the cause of the disturbance of vision in affections of the retina. *Arch. f. Ophth.*, vol. xxxi., 1.

ARLT (12) shows that the cystoid formations found on the floor of the orbit in exophthalmus are due to dilatations of the lower wall of the globe produced by the intra-ocular pressure, the walls of the globe having become less resistant ; they are not produced by traction from without, nor are they cysts external to the globe. These dilatations develop when the fœtal cleft either does not close at all or only very late, and coloboma of the iris and choroid, microphthalmus and anophthalmus, are the result.

MASSE (14) introduced bits of skin, conjunctiva, and cornea into the anterior chamber, which in some cases were absorbed, while in others they gave rise to genuine neoplasms. The implantation of hairs succeeded only when they were still surrounded by a portion of the epidermoid sheath. V. MITTELSTÄDT.

According to TREITEL (15) the essential difference between affections of the optic nerve and those of the retina does not consist in the loss of the color-sense, as this is common to both, but in the manner in which this loss develops. The positive scotoma is an entoptic phenomenon ; the patients see the shadow of the darkened retina. The anomalies of the color-sense in the positive scotoma can be explained as the result of the shadow which covers the cones of the diseased retina. The proper color of the affected retina, besides the shadow cast, has a very essential influence upon the development of anomalies of the color-sense in positive scotoma. In affections of the optic nerve, the anomaly of the color-sense is due to decreased excitability of the fibres of the optic nerve.

b.—GENERAL THERAPEUTICS.

16. BAUDRY. De l'anesthésié générale en chirurgie oculaire. *Soc. franç. d'ophth.*, Jan. 27, 1885.

17. DUJARDIN. De l'exentération du globe oculaire. *Rev. clin. d'ocul.*, 1885, No. 1.

18. FISKE. Exenteratio sive evisceratio bulbi. *Amer. Jour. of Ophth.*, vol. ii., 1.

19. HIRSCHBERG. The electro-magnet in ophthalmology. Leipzig, 1885.

20. PANAS. Des applications de la méthode antiseptique en chirurgie. *Acad. de méd.*, March 24, 1885. *Semaine méd.*, No. 12.

21. PURTSCHER. A proposition in regard to the correction with glasses of certain anomalies of curvature of the cornea. *Arch. f. Augenhk.*, vol. xv., 1, p. 68.

BAUDRY (16) discusses general anæsthesia in operations upon the eye. He chloroformed a healthy girl two years old, who died in convulsions fifteen hours after the operation ; he seeks the cause of death in an irritation of the nerve-centres and meninges produced by the chloroform. Baudry has found, in the literature of the subject published since 1849, forty-seven cases, in which the narcosis has resulted fatally. Anæsthetics are especially dangerous to tubercular children, or those with cerebral congestion, to persons suffering from nervous diseases, to excitable, timid individuals, and to persons with an irregular action of the heart. MARCHWORT.

HIRSCHBERG (19) first gives a historical review of the use of the magnet in removing foreign bodies. He then describes in detail thirty-three operations performed by himself, and concludes with a review of all the cases thus far published. See review in last number, p. 426.

PANAS (20) discards the spray, and recommends sublimate 1:10,000, or biniodide of mercury, 1:25,000, as the best antiseptics. He applies rags moistened with one of these solutions, or covered with a salve of similar composition, and then borated or carbolated cotton. V. MITTELSTÄDT.

III.—INSTRUMENTS AND REMEDIES.

a.—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

22. ARMAIGNAC. Blépharostat à détente instantanée. *Rev. clin. d'ocul.*, No. 11, p. 268.

23. FERRI. La perimetria ed i perimetri registratori. *Ann. di ottalm.*, vol. xiv., 1.

24. GILLET DE GRANDMONT. De la necessité d'une numération commmune en périoptométrie. *Rec. d'ophth.*, March 1885.

25. LANDOLT. Notre blépharostat perfectionné. *Arch. d'ophth.*, vol. v., 1, Jan., Feb., 1885.

26. MAKLAKOW. Ophthalmotonometer. Sowsememoje obosren. 1885, 1. *Wratsch*, No. 7. *Arch. d'ophth.*, vol. v., 2, March, April, 1885.

FERRI (23) discusses the different self-registering perimeters, and describes one constructed by himself. DANTONE.

GILLET DE GRANDMONT (24) advocates the use of a single method of representing the field of vision which would be universally accepted, and describes his mode of expressing it by a single number, the different digits of which correspond to the angles of the different meridians. MARCKWORT.

LANDOLT (25) has replaced the screw of his speculum—described in the Comte rendu de la clinique du Dr. Landolt pour l'année, 1878—with a toothed bar connecting the branches near the spring. The speculum is opened or closed by pressing on one or the other side respectively of a little lever attached to the lower branch. The position of the hooks holding the edges of the lids has also been changed in such a manner that they do not touch when the instrument is closed. It can be inserted and removed very quickly, without pressing upon the globe or coming in contact with the wound.

MAKLAKOW (26) has constructed an instrument consisting of a metallic cylinder with a glass plate 10 *mm.* in diameter at both ends. The cylinder can be suspended by a probe or thread drawn through a transverse slit extending almost through its entire length. The cylinder weighs 10 grms. When it rests with its full weight upon the centre of the cornea (of a cocainized eye), the diameter of the flattened portion of the cornea will be the smaller, the harder the globe. Maklakow covers the glass plates with a thin layer of gentian blue in glycerine, and thus receives on them an impression of the flattened cornea, which he transfers to paper. The diameter of the flattened portion of cornea varied in his investigations (of which he performed 765) between 3.3 *mm.* (glaucoma) and 10.5 *mm.* (iridocyclitis post febrilis). The normal cornea is flattened to the extent of about 6.5 *mm.* He found with his instrument that atropine increases the intra-ocular pressure, while eserine diminishes it, especially in glaucomatous eyes. The instrument is cheap, easy of application, and gives useful results.

HIRSCHMANN.

b.—REMEDIES.

27. CHIBRET. Le sublimé dans l'antisepsie oculaire. *Soc. franç. d'ophth.*, 1885.

28. PIERD' HOUY. L' assettolo in oculistica. *Riforma med.*, vol. i., Jan., 1885.

29. PIERD' HOUY. L' albuminato di rame citro-ammonico in oculistica. *Gazz. med. ital. lomb.*, vol. vii., 2, Jan., 1885.

30. PIERD' HOUY. La scopolia japonica in oculistica. *Gazz. med. ital. lomb.*, vol. vii., 12 and 17.

CHIBRET (27) recommends sublimate in place of all other antiseptics. He directs a stream of a sublimate solution (1:2,000) against the diseased portion of the eye; the deeper the infiltration of the tissue, the stronger the stream must be. Dianoux did not obtain any better results with sublimate, in the concentration in which it may be used for the eye, than with boracic acid.

MARCKWORT.

PIERD' HOUY (28) recommends aseptol as an antiseptic in ophthalmology. Its action is as powerful as that of carbolic acid, but it does not irritate the lids, the conjunctiva, and the corneal epithelium, like carbolic acid and thymol; when used for spraying, it does not produce a burning sensation in the throat like salicylic acid, and does not obstruct the instruments with crusts like boracic acid. DANTONE.

PIERD' HOUY (29) has tried a new copper salt prepared by the chemist Carozzi (cupr. album. c. ammon. citrica, composed of thirty parts of oxide of copper, fifty-seven parts of citric acid, eight parts of albumen, and five parts of ammonia). He used it as a three-per-cent. solution and in the form of a salve, and found it as efficient as the ordinary salts of copper, though much less irritating. DANTONE.

PIERD' HOUY (30) has experimented with the extract of scopolia japanica, and later with the scopoline prepared by Merk, and has found that as a mydriatic it stands between belladonna and hyoscyamus; it dilates the pupil ad maximum and paralyzes the accommodation, though more slowly and for a shorter space of time than belladonna. It might prove useful, therefore, for ophthalmoscopic purposes. DANTONE.

IV.—ANATOMY.

a.—GENERAL ANATOMY.

31. DE VINCENTIIS. Microftalmo bilaterale congenito con molteplici vizi di sviluppo del cuore. *Ann. di Ottalm.*, vol. xiv., 1.

Macro- and micro-scopical description of a case of bilateral microphthalmus ; the globes were the size of peas.

b.—VITREOUS AND LENS.

32. CZERMAK. The question of the zonula. *Arch. f. ophth.*, yol. xxxi., p. 79.

33. DUVAL et RÉAL. Homologies du peigne des oiseaux. *Soc. de biol.*, Dec. 6, 1884. The pecten of birds and the embryonic vitreous of mammals are homologous.

34. HÄNSELL. Recherches sur le corps vitré (conclusion). *Bull. de la clin. ophth.*, vol. iii., 1, p. 18.

CZERMAK (32) has made some new investigations concerning the zonula Zinnii, the results thus far arrived at being inconstant and even contradictory. Only Gerlach's view is tenable in general, while Aeby's is based on an erroneous interpretation, and the conditions described by Kuhnt and Berger simply do not exist. Czermak comes to the following conclusions : 1. The zonula is not a membranous tissue, but a somewhat complicated system of fibres. The space traversed by these fibres belongs to the posterior chamber and is filled with aqueous humor. There is no canal of Petit. 2. The fibres of the zonula come from the vitreous lamella of the pars ciliaris retinæ, not a single one from the vitreous. The vitreous lamella does not pass posteriorly into the internal limiting membrane of the retina, but into the outermost layer of the vitreous. 3. Between the fibres of the zonula a few endothelial plates and many wandering cells are found, which adhere to the fibres with their protoplasmatic processes. 4. As the vitreous lamina does not pass into the internal limiting membrane of the retina, but into the vitreous, this explains the microscopic preparations of Aeby and others, who mistook the detached vitreous lamina of the pars ciliaris retinæ for the zonula itself.

c.—RETINA AND CHOROID.

35. GOLDZIEHER. Peculiar ophthalmoscopic condition in amaurosis. *Wiener med. Wochenschr.*, 1885, No. 11.

36. MAGNUS. Peculiar congenital condition of the macula lutea in both eyes. *Klin. Montatsbl. f. Augenheilk.*, 1885, p. 42.

MAGNUS (36) found the region of the yellow spot of a white, shining appearance, surrounded by the well-known white reflex,

in the centre the cherry-red spot. A few small retinal blood-vessels were visible upon the white surface. The condition was the same in both eyes, and both were amaurotic. It is of interest to note that GOLDZIEHER (35) has recently observed a similar case, confirming the unique ophthalmoscopic observation of Magnus in every respect.

d.—OPTIC NERVE AND CENTRAL ORGANS.

37. MASSELON. Les prolongenients anormaux de la lame cribrée. *Soc. franç. d'ophth.*, Jan. 28, 1885.

38. MONAKOW. The optic-nerve centres and their connection with the visual sphere. *Verhandl. d. phys. Gesellsch. zu Berlin*, Nos. 6–8. *V.* No. 181 of the Report for 1884, German ed.

MASSELON (37) calls attention to the importance of being familiar with cases of congenital abnormal extent of the lamina cribrosa, so as not to confound them with pathological formations. The fibres can be distinguished from opaque nerve fibres by their direction, their interlacing, and color; the latter are also always separated from the papilla by a small zone in which the nerve fibres appear normal, while the abnormal extensions of the lamina cribrosa can be traced to the lamina cribrosa itself. Nicati speaks of the analogy existing between the fibres described by Masselon and fibrous formations observed in some cases of toxic amblyopia. Dor and Parent hold that abnormal continuations of the lamina cribrosa can easily be mistaken for opaque nerve-fibres.

MARCKWORT.

e.—LIDS AND CONJUNCTIVA.

39. WOLFRING. Contribution to the knowledge of the glands of the tarsal cartilage. *Wjestnik ophth.*, Jan., Feb., 1885.

WOLFRING (39) calls attention to the fact that Meibom's glands are longer in the middle of the tarsus and in the upper lid than at the ends of the tarsus and in the lower lid; that they are sometimes curved like a hook, pass around the orbital edge of the tarsus to its anterior surface, or coil themselves around an acino-tubular gland. In regard to the acino-tubular glands the author sustains his former results against Ciaccio, that they are contained in the orbital edge of the nasal half of the upper tarsus, where they open into the conjunctiva of the tarsus, while Kraus' glands generally open in the temporal half, thus insuring moisture to the whole conjunctiva. Wolfring sometimes found acino-tubular glands

between Meibom's glands, not only in the orbital edge of the tarsus, but also remote from it; their bodies extended to the anterior surface of the tarsus, but they opened upon the free tarsal surface of the conjunctiva. In the lower lid the distribution of acino-tubular glands between Meibom's glands is not constant. The author finds that the number, size, and distribution of Kraus' and other acino-tubular glands vary considerably. They certainly play an important part in the pathology of the conjunctiva.

HIRSCHMANN.

V.—PHYSIOLOGY.

a.—GENERAL PHYSIOLOGY.

40. TREITEL. A new method of determining numerically the perception of light. *Centralbl. f. prakt. Augenhk.*, Jan., 1885.

41. TREITEL. On hemeralopia and the examination of the perception of light. *Arch. f. Ophth.*, vol. xxxi., 1.

42. WOLFFBERG. On testing perception of light. A physiologico-clinical study. *Arch. f. Ophth.*, vol. xxxi., 1. From a review by the author.

b.—RETINA AND CENTRAL ORGAN.

43. BERGER. The localization of the cortical visual sphere in man. *Breslauer ärztl. Zeitschr.*, 1885, Nos. 1–5.

44. DEBENEDETTI. Determinazione del centro del movimento del globo oculare. Casimiro Sperino. Festival essay, p. 139.

45. DENISSENKO. The question of the origin of the photopsias in the retina. *Wjestnik ophth.*, Jan., Feb., 1885.

46. EXNER. Critical report on the later physiological investigations in regard to the cortex of the brain. *Biologisches Centralbl.*

BERGER (43) comes to the following conclusions: 1. The first gyrus (and especially its middle portion) of the occipital lobe, now generally recognized by physiologists and pathologists as the visual sphere, is of special importance; the removal of this particular portion alone is sufficient to produce a disturbance of vision. 2. The removal of the cortex alone (at the point named), the corona radiata belonging to it remaining intact, suffices to produce a disturbance of vision. 3. This disturbance of vision is but transitory as long as the other hemisphere remains intact. 4. As regards the much-discussed question of substitution, the

hypothesis holds good in regard to the cortical centre of vision in man which maintains that the corresponding portions of the other hemisphere act in place of the destroyed parts.

DENISSENKO (45) tries to prove that the photopsias described by Mayerhausen are not due to irritation of the nervous elements of the inner granular layer by the overfull blood-vessels, as Mayerhausen supposes, but to mechanical irritation of the rods and cones situated beneath the distended blood-vessels.

HIRSCHMANN.

c.—IRIS.

47. KOWALEWSKY. Investigations on the innervation in dilatation of the pupil. Kasan, 1885.

48. ZEGLINSKI. Experimental investigation on the movement of the iris. *Arch. f. Anat. u. Phys.*, phys. Abth., 1885, 1 and 2.

KOWALEWSKY'S (47) paper consists of an exhaustive historical review of the investigations of the nerve-centres controlling the dilatation of the pupils, followed by a long series of investigations of his own, from which he draws the following conclusions: 1. The hypothesis of Schiff and Salkowsky, as to the course of the nerve fibres dilating the pupils, from the intra-cranial centre through the lateral portion of the cervical portion of the spinal cord, and through the cervical portion of the sympathetic nerve to the eye; also, 2. The hypothesis of Budge, of the existence of an autonomous centre in the spinal cord for the fibres dilating the pupil, do not agree with the facts. 3. The autonomous centre of the fibres dilating the pupil, lies in the cranial cavity, and can be excited by reflex irritation. 4. Inter-central exciting fibres pass from this centre to the cellular origin of the dilators of the pupils in two directions, through the cerebrum and through the spinal cord. 5. The fibres passing through the spinal cord seem to take their course through the lateral columns; each lateral column contains exciting fibres for both sides. 6. The dilators of the pupils coming from the spinal cord do not all pass to the eye through the cervical portion of the sympathetic nerve, some taking another course (vertebral nerve ?). 7. The lateral columns are the main channels for transmitting the irritation from the sciatic nerves to the cerebral centre of the dilators of the pupils, each column containing fibres of both sciatic nerves in the cervical portion of the spinal cord. Each one is capable of trans-

mitting reflex irritation to the dilators of the pupils of both sides. 8. The author also calls attention to the pneumogastric, hypoglossus, lingual, and infra-orbital nerves, which also dilate the pupils by reflex irritation, as well as the sensory nerves. 9. The cerebral centre of the dilators of the pupils can also be excited directly by checking the supply of arterial blood to the brain (by compressing the carotids), and by suppressing respiration. 10. The autonomous centre for the innervation of the third lid, and dilatation of the pupil (protrusion of the eyeball), is also situated in the brain. The fibres coming from it pass only through the spinal cord, through the lateral columns. The peripheral fibres do not all pass through the cervical portion of the sympathetic nerve after leaving the spinal cord, some taking another course.

HIRSCHMANN.

ZEGLINSKI (48) finds that in birds all the fibres which dilate the pupils enter the eye through the ophthalmic branch of the fifth nerve. No fibres affecting the movements of the iris are contained in the cervical portion of the sympathetic nerve of birds. The fibres contracting the pupils pass through the trunk of the oculomotor nerve, through the ciliary ganglion and the ciliary nerves to the ciliary plexus, and thence to the iris. The iris of pigeons is not affected by atropine. The action of atropine on the eyes of mammals is probably due to paralysis of the terminations of the oculomotor nerve, and irritation of the sympathetic nerve. Instillation of curare into the conjunctival sac of birds produces dilatation of the pupil; probably the terminations of the oculomotor nerve are paralyzed. Eserine contracts the pupil by irritating the peripheral endings of the oculomotor nerve. Nicotine acts as a powerful myotic in birds; it irritates the fibres which contract the pupil. He supports the theory which assumes the existence of both a sphincter and a dilator muscle. He declares that the participation of the blood-vessels in dilating the pupil is by no means proven.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

49. DOBROWOLSKY, W. The question of the development of myopia. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 157.

50. ABADIE. Des complications de la myopie progressive. *Soc. franç. d'ophth.*, Jan. 29, 1885; *Rev. clin. d'ocul.*, 1885, No. 3, p. 72.

51. SEELY. Experiences in refractive cases. *Trans. Amer. Ophth. Soc.*, 1884.

52. RISLEY, T. D. A case of hypermetropic refraction passing, while under observation, into myopia. *Trans. Amer. Ophth. Soc.*, 1884.

53. CUTTER, J. C. Myopia among students of Sapporo Agricultural College. *Supplement to the Trans. of the Seikwai*, Tokio, Jan., 1885.

54. HAY, G. Two cases in which Rählmann's hyperbolic lenses improved vision. *Trans. Amer. Ophth. Soc.*, 1884.

DOBROWOLSKY (49) shows how convergence, according to Förster's view, plays the most important part in the development and increase, respectively, of myopia, though there are also cases in which accommodative efforts without convergence produce myopia.

ABADIE (50) recommends tenotomy of the external recti muscles in certain cases of progressive myopia with insufficiency of the internal recti muscles and affections at the posterior pole of the eye; he claims that the operation has a beneficial effect not only upon the muscular asthenopia, but also upon sight and refraction. Bacchi cites himself as an instance of the success of the operation performed on him by Reymond in 1869. Javal seeks the principal cause of progressive myopia, not like Abadie, in convergence, but in accommodation. Dransart attributes the beneficial influence of Abadie's operation to the better surface of filtration produced by it; he therefore recommends iridectomy and sclerotomy in progressive myopia. Chibret believes that both accommodation and convergence are the cause of progressive myopia. Suarez does not prescribe concave glasses until he has made three examinations: one without atropine, one under atropine, and one final examination. According to Dor, treatment with prisms suffices when the dynamic divergence does not exceed 6°; in higher degrees, tenotomy must be performed. Sedan recommends homatropine instead of atropine for preventing the strain on the accommodation. MARCKWORT.

SEELY (51) believes that mixed astigmatism is much rarer than commonly supposed—not having seen a single case in which it was a fixed condition. This, we think, will not be substantiated by the majority of practitioners. Nearly all his examinations are made under a mydriatic, and he always tests the muscular balance. BURNETT.

RISLEY'S (52) patient was a young girl of ten years, with a family history of nervous affections. She herself was affected

with chronic symptoms, and had a mild choroiditis and a low degree ($\frac{1}{80} \supset + \frac{1}{80}{}^c$ ax. 90°) of compound Ah. She complained of headache and photophobia. Six years later the refraction had changed to a low degree of compound Am. Correcting glasses gave relief to the head-symptoms and brought V up to $\frac{20}{10}$. BURNETT.

CUTTER (53) gives the results of the examination of the Japanese students at this college for four years. The following is a summary: Per cent. of M. on entrance to college, 29.5; per cent. of all classes, 54; per cent. of students developing visual incapacities after entrance, 23. No color-blindness was found.

BURNETT.

HAY (54) describes two cases in which Rählmann's hyperbolic lenses improved vision. In case 1: in R $+ \frac{1}{16}{}^c 180°$, in L $+ \frac{1}{12}{}^c 180°$, V $= \frac{12}{16}$. The patient however prefers for L 0.5 system B of Rählmann, and for R 0.5 system A. What improvement in V these give over cylinders is not stated. In case 2: R $- 6^c$ 15°, V $= \frac{12}{200}$; L $+ 2 \frown 4^c$ 135°, V $= \frac{12}{80}$. With 1. system A, L has V $= \frac{12}{40} +$. R with 2 A has V $= \frac{12}{40}$. BURNETT.

VII.—LIDS.

55. STORY, J. B. The operative treatment of entropium and trichiasis. *Ophth. Rev.*, 1885, vol. iv., No. 41, p. 72.

56. DE WECKER, L. Suture contre l' ectropion. *Gaz. méd. de Paris*, 1885, No. 8.

57. GARD. Méthode électrolytique appliqueé à la guérison du chalazion et des kystes glandulaires en général. *Rev. clin. d' ocul.*, 1885, No. 3, p. 85.

58. LEPLAT. Angiome de la face et des paupières guéri par l' électrolyse. *Ann. de la soc. méd. chir. de Liège*, 1885.

59. MACHARDY. Case of ectropium. *Med. Times and Gaz.*, 1885, No. 1812. *The Lancet*, 1885, vol. i., No. 13.

60. *MACHARDY. Favus of the eyelid. *Ibid.*

61. SCHENKL. Extirpation of a tumor of the lid, blepharoplasty. Death six (?) hours after the operation. *Prager med. Wochenschr.*, 1885, No. 15.

62. STORY, J. B. Epithelioma of the eyelid, resulting from irritation by crude carbolic acid. *Ophth. Rev.*, 1885, vol. iv., No. 43, p. 125.

63. PIERD' HOUY. Blefaroplastiche per innesti dermicie blefarorrafie. *Gaz. d' ospitali*, 1885, vol. vi., 3.

64. TERRIER, F. De l' emploi du cautère actuel et du thermo-cautère dans le traitement de l' ectropion, de l' entropion, et du trichiasis. *Arch. d' ophth.*, 1885, vol. v., i., p. 9.

65. BAUDRY. Contribution à l' étude du chancre des paupières. *Arch. d' ophth.*, 1885, vol. v., i., p. 55.

66. TRÉLAT. Epithelioma de la paupière inférieure. *Gaz. des hôp.*, 1884, p. 901.

67. RAMPOLDI. Tre casi di blepharoptosi congenita atrofica. *Ann. di ottalm.*, vol. xiv., 1.

68. SWANZY, H. R. Transplantation of skin flaps without a pedicle for the cure of cicatricial ectropia. *The Lancet*, 1885, vol. i., No. 13, p. 568.

69. MACHARDY. Fat in upper eyelids. *Ophth. Soc. Unit. Kingd.*, May 14, 1885.

70. DERBY, R. H. A case of gangrene of the lids, with subsequent restoration of tissue without a plastic operation. *Trans. Amer. Ophth. Soc.*, 1884.

71. FRYER, B. E. A successful case of skin-flap transplantation without a pedicle, after removal of an epithelioma from the lower lid. *Trans. Amer. Ophth. Soc.*, 1884.

72. BULL, C. S. Three cases of restoration of the eyelid by transplantation of a flap without a pedicle. *Trans. Amer. Ophth. Soc.*, 1884.

STORY (55) reports four cases in which he cured entropium and trichiasis by transplanting a flap of mucous membrane or skin to the conjunctiva of the lids.

WECKER (56) makes use of a suture with two stitches in senile ectropium, which he expects to draw the conjunctiva inward without producing inversion of the eyelashes.

LEPLAT (58) reports the cure by electrolysis of a congenital and still growing angioma of the lids of the left eye and adjoining cheek and temple in a child eight years old. Two needles are always introduced beneath the skin, and at each sitting—twenty-nine in all—the negative needle is pushed in two or three times at different places, the positive needle remaining in position. The stitch canal suppurated only twice. The author recommends platinum instead of golden needles, at least for the positive pole, as Nieden has also done. V. MIDDLESTÄDT.

MACHARDY (59) operated upon a man thirty-nine years old ac-

cording to a new method proposed by Argyle Robertson, for ectropium of the upper lid, the result of chronic conjunctivitis. He also (60) saw a large ulcer of the upper lid extending to the margin of the conjunctiva in a woman thirty-seven years old. He extirpated it and found that it was due to favus.

SCHENKL (61) performed blepharoplasty in narcosis without accident, upon a woman sixty-six years old, after removing a tumor of the lid. Two (?) hours later the patient fell into collapse and died. The autopsy showed that embolism of the coronary artery was the cause of death.

An epithelioma of the upper lid developed from the long-continued influence of carbolic acid, and was removed by STORY (62) by a V-shaped excision. The lid was shortened, but could perform its functions.

PIERD' HOUY (63) transplanted flaps without a pedicle from the inner surface of the upper arm in three cases of ectropium on account of the size of the defect ; they took hold very well.

DANTONE.

TERRIER (64) gives a historical review of the methods of treating ectropium, entropium, and trichiasis with the actual cautery. In entropium and trichiasis he makes a wound with the thermo-cautery along the edge of the lid penetrating to the cartilage ; in some cases he first divides the skin of the lids with a knife. Good results were attained in three cases. Four other cases illustrate the method devised by Vieusse : two or three linear wounds 1½ *cm.* long are made with the thermo-cautery perpendicular to the edge of the lid, but not penetrating to the cartilage. The scars are scarcely visible in either method, especially the former.

v. MITTELSTÄDT.

RAMPOLDI (67) describes three cases of congenital complete blepharoptosis. Strange to relate, two of them occurred in father and son, and a third in an inhabitant of the same district.

DANTONE.

SWANZY (68) performed transplantation of flaps without a pedicle in six cases of cicatricial ectropium, in four of them successfully.

MACHARDY (69) observed in a girl of sixteen marked development of fatty tissue, causing deformity of the upper lid. He excised an elliptical piece, which greatly improved the condition.

DERBY'S (70) interesting case shows how efficiently nature can repair her losses without the assistance of the surgeon's knife.

BURNETT.

FRYER (71) reports the successful transplantation of a skin flap without a pedicle to the lower lid after the removal of an epithelioma. The point of difference between the operation and that usually done, was the absence of sutures and the application of goldbeater's skin-plaster fitting closely to all irregularities of surface. There was no suppuration. BURNETT.

BULL'S (72) cases were all successful, there being no suppuration except at the points where the sutures were inserted. In one case there was no great shrinkage six months after the operation ; in the others contraction was still in progress.
BURNETT.

BAUDRY (65) observed transmission of syphilis to two children by adults, who tried to remove with saliva the crusts along the margins of the lids due to blepharo-conjunctivitis. In both cases the chancre was situated near the inner canthus, once above and once below, near the lachrymal points. The author also discusses other ways of transmitting syphilis to the eyes and their appendages. V. MITTELSTÄDT.

VIII.—LACHRYMAL APPARATUS.

73. MANHAVIELLE. Essai sur la tumeur et la fistule lacrymale et leur traitement spécialement par l'ignipunctur du sac. *Thèse de Montpellier*, 1884.

74. POOLEY, T. R. Case of acute dacryoadenitis. *Trans. Amer. Ophth. Soc.*, 1884.

75. JOYE, T. A. The treatment of chronic dacryocystitis. *Med. Rec.*, May 16, 1885.

In obstinate cases of lachrymal affections MANHAVIELLE (73) advises treatment of the mucous membrane with the thermocautery after previously splitting the skin or fistula. Four observations. V. MITTELSTÄDT.

POOLEY (74) reports an acute inflammation of the lachrymal gland of the right eye during the subsidence of a diphtheritic inflammation of the conjunctiva of the left. There was a temperature of 100°, and a pulse of 120. There was a clearly outlined, painful tumor at the upper outer angle of the orbit, associated with swelling of the lids and chemosis. It did not go on to suppuration. The treatment was hot compresses, quinine, and iron.
BURNETT.

JOYE (75) relates three cases in which the injection into the sac of a four-grain solution of atropine was followed by a cessation of

the discharge. In all the cases other methods—probing, astringents, etc.—had been of no avail. BURNETT.

IX.—MUSCLES AND NERVES.

76. CLARK, C. J. A case of divergent squint. Unusual difficulties in correcting it by operation. *Amer. Journ. Ophth.*, vol. i., 9, p. 273.

77. DE WECKER, L. Procédé opératoire contre le strabisme. *Soc. franç. d'ophth.*, Jan. 26, 1885. *Gaz. méd. de Paris*, 1885, No. 8.

78. LAINEY. De l'avancement capsulaire. *Thèse de Paris*, 1885.

79. LANDOLT. De l'amplitude de convergence. *Arch. d'ophth.*, 1885, vol. v., 2, p. 97.

80. STILLING, J. The development of squint. *Arch. f. Augenhk.*, vol. xv., p. 73.

81. EALES, H. The causes and treatment of convergent squint. *Birm. Med. Rev.*, 1885, p. 164.

82. FUCHS, E. A peculiar form of muscular asthenopia. *Arch. f. Augenhk.*, vol. xiv., p. 385.

CLARK (76) describes a case of divergent squint. Simple division of both external recti giving no relief, the author, after again dividing them and inserting a suture in the conjunctiva of each eye near the inner margin of the cornea, passed them through the skin at the inner canthus and tied them across the bridge of the nose, producing thus a considerable degree of convergence. In this manner parallelism of the visual axes was finally obtained. BURNETT.

WECKER (77) discusses and recommends advancement of Tenon's capsule, lately published by himself, combined with tenotomy. Abadie prefers this operation to advancement of the muscle, as its effect can be more easily increased or decreased in a few days, while Meyer prefers the simple conjunctival suture to the other two operations. MARCKWORT.

LANDOLT (79) explains his method of determining the amplitude of convergence with his ophthalmodynamometer, and commends the instrument as suitable for determining muscular asthenopia, especially in those cases which can be cured only by operation. The amplitude of convergence is equal to the difference between its maximum and minimum, and under normal conditions is equal to

about 10.5 metreangles (Nagel). Ametropia, except of high degree, has no influence upon it. A portion of the amplitude of convergence is positive, and equal to the angle included between ∞ and the punct. prox., or about 9.5 metreangles; the negative portion, beyond ∞, is equal to 1.5 metreangles. Landolt found that in near work the amplitude of convergence should not exceed ⅓ of the total positive amount, otherwise muscular asthenopia will be the result. If the latter exists, the instrument will determine its degree, and the ratio between the positive and negative amplitude, a determination of the greatest importance in deciding whether tenotomy, with or without advancement, or the latter alone, shall be performed. Landolt is very much in favor of simple advancement, which does not produce diplopia for distance, like tenotomy of the external rectus, without materially increasing the amplitude of convergence, but increases the latter towards the positive side, and, what seems strange, towards the negative also, as could be demonstrated beyond a doubt. Landolt's instrument also seems well adapted for determining the immediate effect of the operation. V. MITTELSTÄDT.

According to STILLING (80) strabismus consists in relinquishing binocular fixation, and placing one eye in its natural position of equilibrium. If this is convergence, convergent strabismus results; if divergence, divergent strabismus; if it is a parallel position of the axes, an absolute strabismus cannot result. In the majority of cases of hypermetropia, convergence is the position of equilibrium, in myopia divergence.

FUCHS (82) reports a peculiar case of muscular asthenopia in a hypermetropic individual.

83. MAUTHNER, C. The pupil and accommodation in paralysis of the oculomotor nerve. A contribution to the knowledge of nuclear paralysis. *Wiener med. Wochenschr.*, 1885, Nos. 8, 9, 10.

84. JAN. Paralysie du nerf moteur oculaire commun de l'œil droit d'origine nicotinique. *Rec. d'ophth.*, 1885, No. 2, p. 98.

85. MENDEL. Contribution to the knowledge of diphtheritic paralysis. *Centralbl. f. prakt. Augenhk.*, 1885, p. 89.

86. PARINAUD et MARIE. Névralgie et paralysie oculaire à rechutes. *Rev. clin. d'ocul.*, 1885, No. 3, p. 80.

87. UHTHOFF, W. A case of paralysis of all the muscles of the eye after diphtheria of the throat. *Neurol. Centralbl.*, 1885, No. 6.

88. Szili. Ophthalmoplegia chronica progressiva. *Wiener med. Wochenschr.*, 1885, No. 10.

89. Kazaurow. A case of nuclear ophthalmoplegia. *Wjestnik ophth.*, March, April, 1885.

Mauthner (83) divides the paralysis of the oculomotor nerve: (1) into those in which the iris and accommodation are not affected; (2) into those in which the sphincter is paralyzed while the accommodation remains intact; (3) into those in which only the reaction to light is lost; and finally (4) into those in which the pupil is contracted. They are all explained by referring them to a nuclear cause. In the last form of paralysis of the oculomotor nerve, the total paralysis, with dilatation of the pupil ad maximum, the cause may be situated at the base of the brain, though a nuclear affection is not excluded.

Jan (84) describes a case of paralysis of the right oculomotor nerve (ptosis, strabismus divergens, dilatation of the pupil), which he is inclined to attribute to tobacco-poisoning. There were no color-scotomata, and V was good. Marckwort.

Mendel (85) observed paralysis of the velum palati, of both oculomotor nerves, and weakness of the lower extremities, after diphtheria of the throat. The patient died soon afterwards of paralysis of the lungs. The autopsy of the brain showed marked hyperæmia of its smaller arteries and capillaries, also capillary hemorrhages, and hemorrhages in the region of the nucleus of the oculomotor nerve, in the pons, and in the medulla oblongata. The ganglionic cells of the nuclei of the nerves were normal, but parenchymatous and interstitial neuritis were easily traceable in the peripheral nerves, especially the oculomotor, abducent, and pneumogastric nerves, in their course within the substance of the brain and after their exit.

Uhthoff (87) reports the case of a boy in whom paralysis of all the muscles of the eye gradually developed two weeks after diphtheria of the pharynx, accompanied by weakness of the lower extremities. The former condition had disappeared after eight weeks.

Szili (88) reports a case of chronic progressive ophthalmoplegia in a woman forty years old, with concentric limitation of the field of vision, discoloration of both optic nerves, divergence of the globes, and a sinking down and complete closure of the lids.

X.—ORBIT AND NEIGHBORING CAVITIES.

90. Lopez. Kyste sebacé volumineux de l'orbite. *Rec. d'ophth.*, 1885, No. 2, p. 103.

91. CAMPART. Contribution à l'étude de l'angiome caverneux de l'orbite. *Bull. des quinze-vingts*, 1885, p. 1.

92. KIPP, J. C. Cases of disease of the frontal sinus. *Trans. Amer. Ophth. Soc.*, 1884.

93. NORRIS, W. F. Myxosarcoma of the orbit. *Trans. Amer. Ophth. Soc.*, 1884.

94. LIPPINCOTT, J. A. Two cases of orbital abscess. *Trans. Amer. Ophth. Soc.*, 1884.

LOPEZ (90) describes an atheroma of the orbit the size of a pigeon's egg ; it was situated in the upper outer portion of the orbit and had pushed the eye downwards and inwards. It was divided into two parts and removed. The pressure of the tumor had produced neuro-retinitis, which, together with ptosis, still existed almost unchanged a month after the operation.

MARCKWORT.

CAMPART (91) saw a cavernous angioma of the orbit develop in a girl of fourteen in the course of four years, due to the blow of a blunt object on the supraciliary region. When removed it was found to be attached to the external rectus muscle and to have a continuation extending posteriorly. v. MITTELSTÄDT.

KIPP (92) reports two cases of disease of the frontal sinus. Case 1.—Abscess of frontal sinus, ethmoidal and sphenoial cells. The patient was a man 54 years old, who had suffered many years with frontal headache. About a year before he was first seen he had noticed diplopia and protrusion of the left eye. A tumor was felt at the upper inner part of the orbital cavity, which pushed the globe downwards and outwards. V was not impaired. The probable diagnosis was a sarcoma of the periosteum. On exploration the tumor was found to be hard as bone in places, and gave way at one point under pressure, letting out a quantity of fetid pus. The eyeball resumed its normal position, but in ten days a pneumonia set in which terminated the patient's life. A post-mortem examination showed that the frontal sinus, ethmoidal cells, and sphenoid sinus had been converted into one large cavity, whose bony walls were carious. The dura mater was normal. Case 2.—Distension of the frontal sinus ; cured by applications to the mucous membrane of the nose and pressure on the tumor. The patient was a woman 57 years of age, who had suffered for many years from an almost constant pain in the left frontal region. She had always had a naso-pharyngeal catarrh. A tumor

about the size of a hickory-nut was situated at the upper inner angle of the orbit, which displaced the ball down and out. At one examination the tumor gave way under pressure, and a quantity of bloody muco-purulent matter passed into the throat. After this the sac was frequently emptied by pressure, and the nasal mucous membrane treated with nitrate of silver. The eye regained its proper position. V is normal. BURNETT.

NORRIS' (93) patient was a child 4 months old. The right eye became prominent at two months. In two weeks from the time when first seen, a hard tumor was felt at the inner edge of the orbit, and the eyeball was turned in and down. The contents of the orbit were evacuated. The growth was found attached to the periosteum in places, and these were scraped clean. There was a recurrence of the growth on the lower lid in a year, which was removed. A third recurrence, which was not seen by the author, resulted in the death of the child from loss of blood. The tumor was found on examination to be a round- and spindle-celled sarcoma, with a large development of myxomatous tissue.

BURNETT.

LIPPINCOTT (94) reports two cases of orbital abscess. Case 1. —A child who was recovering from an attack of erysipelas of the face and scalp was seized with exophthalmus accompanied by febrile disturbances. The eyeball was protruded half an inch, hardly movable, and directed downwards and outwards. An incision was made to the inner side of the globe and a little upwards, and a drachm of pus was let out. There were at no time any abnormal ophthalmoscopic appearances, nor was V impaired. Case 2 was one of idiopathic abscess of the orbit in a girl a year old. The abscess was emptied. but there was atrophy of the disc and narrowing of the retinal vessels. V = perception of light.

BURNETT.

XI.—CONJUNCTIVA, CORNEA, SCLEROTIC.

95. HAAB, O. The etiology and prevention of blennorrhœa neonatorum. *Correspondenzbl. f. Schweizer Ærzte*, 1885.

96. UFFELMANN. The prevention of blennorhœa neonatorum. *Deutsche Medicinalztg.*, 1885, No. 6.

97. DARRIER. De l' ophthalmie virulente. *Rev. clin. d' ocul.*, 1885, No. 3, p. 79.

98. FIEUZAL. Conseils aux mères dans le but de prevenir

l'ophthalmie purulente des nouveaux-nés. *Bull. de la clin.-nat. ophth.*, 1885, vol. iii., 1, p. 78.

99. KIPP, C. J. On the prevention and treatment of purulent conjunctivitis. *Trans. Med. Soc. of N. J.*, 1884.

100. ABADIE. De l' ophthalmie virulente. *Progr. méd.*, 1885, p. 1087.

101. BROWNE, E. A. The treatment of blennorrhoic conjunctivitis. *Brit. Med. Journ.*, Jan. 10, 1885, p. 68.

102. MCKEOWN, D. Prevention of ophthalmia neonatorum and its ravages. *The Lancet*, Feb., 1885, p. 345.

103. COWELL, G. Purulent ophthalmia in infants. *Brit. Med. Journ.*, March, 1885, p. 508.

104. SÉDAN. Note sur un cas d' ophthalmie catarrhale de forme intermittente. *Soc. franç. d'ophth.*, Jan. 29, 1885.

105. LUCAS, CLEMENT. Gonorrhœal rheumatism in an infant, the result of purulent ophthalmia. *Ophth. Rev.*, 1885, No. 42, p. 114.

106. WIDMARK, JOHANN. Ytterligare nagra iakttagelser om gonokockernas förekomst vid purulent konjunktivit samt vid purulent vulvovaginit hos minderariga. *Hygiea*, 1885, vol. xlvi., No. 6.

107. ANDREWS, J. H. Jequirity ophthalmia. *Trans. Amer. Ophth. Soc.*, 1884.

108. THIERON. Le jequirity, effets physiologiques et applications therapeutiques. *Thèse de Montpellier*, 1884.

109. PEUNOW, A. The application of jequirity in trachoma. *Wjestnik ophth.*, 1885, Nos. 1 and 2.

110. SATTLER, R. The physiological effects and therapeutic uses of berberine and hydrastine in ophthalmic and aural practice. *Drugs and Medicines of North America*, 1885, vol. i., 5, p. 171.

111. GELPKE, TH. On pemphigus of the conjunctiva. *Zeh. klin. Monatsbl. f. Augenhk.*, 1885, p. 191.

112. STEFFAN. Pemphigus of the conjunctiva. *Zeh. Klin. Monatsbl. f. Augenhk.*, 1885, p. 214.

113. GAYET. La tuberculose conjonctivale. *Soc. franç. d' ophth.*, Jan. 28, 1885.

114. PFLÜGER. Melanosarcoma of the conjunctiva. *Bericht d. Univ. Augenkl. zu Bern für* 1883, Bern, 1885, p. 16.

115. BURCHARDT, CL. The treatment of eczema. *Monatsbl. f. prakt. Dermatologie*, 1885, No. 2.

HAAB (95) calls attention to the fact that since the introduction of Credé's method the percentage of blennorrhœa neonatorum has fallen from nine to one per cent., and therefore recommends making it obligatory. Simple catarrh of the new-born must be distinguished from blennorrhœa. In the latter Neisser's gonococci are always found, in the former not.

UFFELMANN (96) also considers Credé's method a great advance in preventive medicine. He wants to confine the practice of the method, however, to the lying-in asylums for the present. The midwives should be instructed to report at once to the physician even the slightest case of inflammation of the eye. FIEUZAL (98), MCKEOWN (102), and COWELL (103) entertain similar views.

KIPP (99) believes thoroughly in the inoculative origin of ophthalmia neonatorum, and thinks it can be prevented by cleanliness and antiseptic treatment of the mother and child during and immediately after parturition. In the treatment of the disease when established he employs cleanliness and cold in the early stages; in the second he uses nitrate of silver, beginning with a one-per-cent. solution, and increasing it if necessary to two per cent. BURNETT.

ABADIE (100) recommends, as he has done before, energetic cauterization with nitrate of silver at intervals of twelve hours, in severe cases of blennorrhœa in which the micrococcus is present, in order to prevent affection of the cornea. In milder forms, in which the micrococcus is absent, weaker solutions and even simple antiseptic cleansings are sufficient. V. MITTELSTÄDT.

BROWNE (101) recommends an apparatus constructed by himself for removing blennorrhoic pus from the fornix of the upper lid in cases of great swelling. He uses a two-per-cent., and afterwards a one-per-cent., trichlor.-phenol solution for irrigation.

SÉDAN (104) reports a case of intermittent fever observed in Algier, in which muco-purulent discharge developed in both eyes during the febrile attacks, which disappeared as soon as the fever ceased. MARCKWORT.

LUCAS (105) observed swelling of the left knee in an infant eighteen days old, suffering from blennorrhœa neonatorum. He is inclined to believe in a connection between the two diseases. The gonorrhoic virus was absorbed by the conjunctiva, and thus entered the body.

WIDMARK (106) found the gonococcus in nineteen among twenty-

five cases of blennorrhœa neonatorum. The secretion was transferred to the male urethra in three cases, but without success.

ANDREWS (107), after considering some of the causes of the disastrous results of jequirity ophthalmia, suggests that the best way to avoid them is to begin with mild doses of the remedy—two-per-cent. infusion when there is pannus, and one-per-cent. when the cornea is free, and insists that the action of the drug should never be kept up by compresses wet with the infusion.

BURNETT.

THIERON (108) saw very severe consequences follow the introduction of pulverized jequirity beans into the eyes of five Indians, who had resorted to them to escape military service. Although treatment was begun two days later, the final result was either total or adherent leucoma, staphyloma, and total atrophy. Jequirity powder produced infiltration of the cornea in dogs. According to Thieron, jequirity should not be used either as a powder or as a salve, but only as an infusion. Wecker's method gives good results in properly selected cases.

v. MITTELSTÄDT.

PEUNOW (109) favors the two-per-cent. cold infusion, which is strong enough when used fresh, and is less dangerous to the cornea than stronger infusions. His results are not particularly satisfactory. HIRSCHMANN.

SATTLER (110) found that berberine solutions had little or no effect on the catarrhal inflammations of the conjunctiva. On the contrary the hydrochlorate of hydrastine was found of decided benefit in the chronic forms of this affection. It is also of use in granular conjunctivitis and marginal blepharitis. It is used in aqueous solutions of from two to five per cent. BURNETT.

GELPKE (111) reports a case of pemphigus of the conjunctiva. The corneæ sloughed, and the eyes were destroyed. STEFFAN (112) also reports that in the case previously described by him, sloughing of the cornea had set in.

GAYET (113) reports a case of tuberculosis of the conjunctiva, during the course of which swelling and suppuration of the cervical glands set in. The microscopical examination showed it to be the lupous form of tuberculosis. Lupus is now considered only a variety of tuberculosis, but, as Parinaud says, the clinical difference is very great. Dufour mentions a case analogous to that of Gayet, in which the lungs were still free four years after the beginning of the conjunctival affection. In a case of tubercu-

losis of the cornea observed by Nicati, death occurred two months later from acute phthisis. MARCKWORT.

PFLÜGER (114) removed a small-celled melano-sarcoma from the inner angle of the conjunctiva of the right eye.

BURCHARDT (115) calls attention to the causal connection between moist eczema and affections of the conjunctiva and cornea. The former he cures, after he has removed the crusts by soaking, and cut off the hairs, by brushing a three-per-cent. solution of nitrate of silver over it, daily at first, afterwards every other day. The affection of the eye generally disappears of its own accord.

116. ADLER, H. The electrolytic treatment of permanent opacities of the cornea. *Wiener med. Wochenschr.*, 1885, No. 18.

117. CICARDI. Un nuovo caso di stati linfatica oculare. *Ann. di ottalm.*, vol. xiv., 1.

118. RAMPOLDI. Pro justitia et veritate. *Ann. di ottalm.*, vol. xiv., 1.

119. FROTHINGHAM. A case of corneal staphyloma; enucleation with remarks. *Physician and Surgeon*, May, 1884.

120. ABADIE, CH. Traitement du staphylôme partiel et progressif; staphylotomie. *Ann. d'ocul.*, 1885, vol. xciii., p. 5.

121. DAGUILLON. Contribution à l'étude du staphylôme pellucide conique de la cornée. *Bull. de la clin.-nat. ophth.*, 1885, vol. iii., 1, p. 60.

122. GALEZOWSKI. De l'anesthesie de la cornée dans l'herpes febrile de cette membrane. *Rec. d'ophth.*, Mar., 1885.

123. DOLSCHENKO, B. Cancer of the cornea. *Wjestnik ophth.*, 1885, vol. i., pp. 23–31.

124. PANAS et VASSAUX. Étude experimentale sur la tuberculose de la cornée, *Soc. franç. d'ophth.*, Jan. 28, 1885. *Gaz. méd. de Paris*, 1885, No. 8.

125. FALCHI. Fibroma della cornea. *Ann. di ottalm.*, vol. xiv., 1, p. 36.

126. MAGAWLY. Lepra infiltrations in the cornea. *Petersb. med. Ztg.*, 1885.

ADLER (116) treated a number of corneal opacities with the constant current. He used five elements and applied Seeger's electrode directly to the affected cornea of the eye previously put under the influence of cocaine and atropine. They cleared up partially after being treated from three to four weeks. The

method, however, is contra-indicated in total leucoma attended with inflammation of the iris, cornea, and conjunctiva.

CICARDI (117) reports another case of opacity of the cornea which appeared when the head was bent forward. Rampoldi has observed several instances of this kind, and he attributes them to an infiltration of the cornea with lymph corpuscles. Cicardi's case was one of a girl of fourteen with iritis, adhesions, and turbidity of the aqueous of the left eye. The phenomenon, however, was observed in both eyes, though there was only slight photophobia of the right eye. DANTONE.

A review by Remak in the *Centralbl. f. Augenhk.*, of Nagel's "Ein pathologisches Circulationsphänomen" leads RAMPOLDI (118) to deny that in the cases described by him the infiltration of the cornea was due to pus corpuscles which had entered the posterior layers of the cornea from the anterior chamber. He sustains his observations of the lymphatic infiltration of the cornea, and reports a case of hemorrhage into the anterior chamber, in which the blood entered between Descemet's membrane and the endothelium when the head was inclined forward, penetrating to the centre of the cornea and returning but very slowly. DANTONE.

FROTHINGHAM (119) condemns as unsafe every operation other than enucleation for staphyloma of the cornea. BURNETT.

In cases of progressive partial staphyloma of the cornea, due to extensive anterior synechiæ, ABADIE (120) recommends abscission of the iris from the cornea with a Graefe knife, thus terminating the harmful strain upon the iris. Abadie performs the operation by passing a knife through the iris behind the leucoma, and then abscising the iris by sawing movements. MARCKWORT.

GALEZOWSKI (122) discusses febrile herpes of the cornea, and calls particular attention to the insensibility of the affected portion of the cornea, a fact frequently of importance for the diagnosis. Compressive bandage not only alleviates the pain, but also aids in the recovery. Three clinical histories. MARCKWORT.

DOLSCHENKO (123) describes a case of cancer of the cornea. The tumor occupied its whole surface and thickness as far as the limbus, from which it possibly started. The conjunctiva was unaffected and densely infiltrated with lymph-corpuscles in the immediate neighborhood of the tumor, but without a trace of cancerous elements. HIRSCHMANN.

PANAS and VASSAUX (124) made experimental studies on rab-

bits on tuberculosis of the cornea. The duration of the different periods of the disease was about as follows: Incubation, eight to ten days; ulceration, from the eighth to the twenty-second day; repair, from the twelfth to the forty-fourth day. Sometimes the cornea was destroyed, and sometimes the period of ulceration was absent. The autopsy never showed tuberculosis of the inner organs, though the animals were observed from two to eight months. The process remained entirely confined to the cornea, except when the tuberculous mass entered the anterior chamber after perforation of the cornea. According to Gillet de Grandmont and Parinaud the tuberculous process spreads easily and rapidly from the cornea to other parts of the body.

MARCKWORT.

MAGAWLY (126) saw a lepra nodule the size of a pea at the upper edge of the cornea in a patient twenty-eight years old. He had been suffering for four years from the tuberous form, which had attacked his face, neck, and forearm. The skin was not anæsthetic over the affected parts.

127. DANESI. Della scleritide. *Boll. d'ocul.*, Jan. 5, 1885. vol. vii.

128. PFLÜGER. Melanosarcoma of the sclero-corneal margin, *Ber. d. Univ. Augenkl. zu Bern f.* 1883, Bern, 1885, p. 18.

DANESI (127) has obtained good results in scleritis and episcleritis by subcutaneous injections of pilocarpine. DANTONE.

PFLÜGER (128) removed a melanosarcoma from the sclero-corneal margin. Within the next four weeks he was obliged to destroy new formations of the growth several times with the galvano-cautery and sharp spoon. There were no further relapses. The globe was preserved.

129. EVERSBUSCH, O. The application and action of muriate of cocaine as a local anæsthetic. *Ærztl. Intelligenzbl.*, 1885, Nos. 1 and 2.

130. SCHWEIGGER, C. On cocaine. *Centralbl. f. prakt. Augenhk.*, 1885, p. 1. *Berlin. klin. Wochenschr.*, 1885, No. 4.

131. BERTHOLD. The physiological action of cocaine. *Centralbl. f. med. Wissensch.*, 1885, No. 9.

132. FIEUZAL. De la cocaine en thérapeutique oculaire. *Bull. de la clin.-nat. ophth.*, 1885, vol. ii., No. 4, p. 161.

133. KEYSER, P. D. Cocaine in ophthalmic surgery. *Ther. Gaz.*, Jan., 1885.

134. Lundy, Ch. Oleate of cocaine in ophthalmic practice. *N. Y. Med. Journ.*, vol. xli., No. 9, p. 246.

135. Pierd' Houy. La cocaina in oculistica. *Riforma med.*, Jan. 12, 1885.

136. Emmert, E. Cocaine. *Correspondenzbl. f. Schweizer Ærzte*, 1885, vol. xv.

137. Meyer, E. Encore un mot sur la cocaine. *Rev. génér. d'ophth.*, 1885, vol. iv., 3, p. 97.

138. Pierd' Houy. L' oleate di cocaina in oculistica. *Gazz. med. italiana-lombardia*, 1885, No. 15.

139. Warlomont. La cocaine en ophthalmologie. *Ann. d'ocul.*, 1885, p. 151.

140. Frank. Défaut d' action de la cocaine sur la zone motrice corticale. *Soc. de biol.*, S. du 29. Nov. 1884.

141. Panas. De l' anesthésie en chirurgie oculaire. *Union méd.*, 1885, p. 1,045.

142. Terrier. Cocaine et chloroforme. *Semaine méd.*, 1885, No. 11, p. 86.

143. Grasselli. La cocaina nella terapia oculare. *Gazz. med. ital.-lombard.*, vol. vii., 4–12.

144. Rampoldi. Note pratiche di terapeutica oculare. *Ann. di ottalm.*, vol. xiv., 1.

145. Turnbull, Lawrence. The new local anæsthetic, muriate of cocaine. Philadelphia, 1885, pp. 79.

146. Lyons, A. B. Hydrobromate of cocaine. *N. Y. Med. Rec.*, May 9, 1885.

147. Calhoun, A. W. Enucleation of an eyeball under cocaine. *Atlanta Med. and Surg. Journ.*, March, 1885.

148. Taylor, R. H. Hydrochlorate of cocaine in catarrhal ophthalmia. *Atlanta Med. and Surg. Journ.*, May, 1885.

149. Little, W. C. Therapeutic action of cocaine in a case of diphtheritic conjunctivitis. *Med. and Surg. Rep.*, Feb. 21, 1885.

150. Wilson, W. J. Opacity of the cornea produced by cocaine. *N. Y. Med. Rec.*, May 16, 1885.

151. Careras Arago. Cocaine in ophthalmology. *Revista de ciencias médicas de Barcelona*, Dec. 10, 1884. *Centralbl. f. prakt. Augenhk.*, 1885, p. 24.

152. Königstein. The application of cocaine to the eye.

Centralbl. f. d. ges. Therap., 1885, vol. iii., 1, p. 4; *Allg. Wiener med. Ztg.*, 1885, No. 29, p. 590.

153. FODOR, F. Exenteration of the globe under cocaine. *Wiener med. Blätter*, 1884, p. 1576.

154. JUST. On cocaine. *Centralbl. f. prakt. Augenhk.*, 1885, p. 61.

155. WICHERKIEWICZ. Some experiences on the application and therapeutic value of cocaine in ophthalmology. *Centralbl. f. prakt. Augenhk.*, 1885, pp. 85 and 115.

156. COHN, H. On cocaine. *Centralbl. f. prakt. Augenhk.*, p. 110.

157. PECK, STEVENS, MINOR. Unpleasant experiences with cocaine. *Centralbl. f. prakt. Augenhk.*, 1885, p. 113.

158. MAYERHAUSEN, G. A case of intense cocaine-intoxication after instillations into the conjunctival sac. *Wiener med. Presse*, 1885, No. 22.

EVERSBUSCH (129) attributes the mydriasis after instillation of cocaine mainly to contraction of the blood-vessels of the iris with anæmia of that membrane. He also refers the slight paresis of accommodation to this cause. The former condition he could demonstrate by means of a Brücke lens in the eye of an albinotic rabbit.

BERTHOLD (131) brought cocaine into direct contact with smooth muscular fibres, the sartorius muscle and heart of the frog, and found that the muscles were paralyzed, while the heart's action was retarded until it finally ceased altogether. When cocaine was injected into the anterior chamber of rabbits' or cats, eyes, total paralysis of the sphincter resulted in a few minutes, as also of the dilating elements of the iris, as was shown by the negative result of irritating the cervical portion of the sympathetic nerve. That cocaine simply paralyzes the sympathetic nerve, and is, therefore, analogous in its action to atropine, was also demonstrated by the fact that injections of a solution into the jugular vein produced an enormous sinking of the intravascular pressure without any trace of a preceding increase. He also found that when the pupil of a rabbit's eye had been made to contract by irritating the fifth nerve, injection of cocaine into the anterior chamber caused it to dilate again.

SCHWEIGGER (130) confirms Nieden's experience of the value of cocaine in treating purulent keratitis with the galvano-cautery,

the drug making it possible to destroy even the slightest traces of the ulcer with the glowing loop. He performed sclerotomy in glaucoma, where a narrow pupil is an essential condition, while the eye was under the combined influence of cocaine and eserine, the dilating action of the former being neutralized by the contracting influence of the latter, making the operation painless, and preventing prolapse of the iris. Schweigger had previously put his patients under the influence of chloroform when operating for cataract, but has given this up almost entirely since the introduction of cocaine. He was obliged, however, to modify the technique he had followed during the last few years. Hitherto he had opened the capsule with a toothed forceps, as recommended by Colsmann and Förster, in order to extract as large a piece of the lens capsule as possible. As the pressure of the external muscles of the eye upon the globe is removed during deep chloroform-narcosis, he rarely had loss of vitreous. The tension of the external muscles, however, was not affected by the local cocaine-narcosis, and, as a consequence, the interior of the eye was under greater pressure than in chloroform-narcosis. (This condition must not be confounded with an increase of the intraocular pressure. Schweigger only maintains that in cocaine-narcosis the muscles, not being paralyzed, exert some pressure upon the globe, which is not possible in chloroform-narcosis, the muscles being completely paralyzed.—REV.) Under such conditions prolapse of vitreous could occur more easily, which induced Schweigger to return to the old method of opening the capsule with the cystitome. In squint-operations only the seizing and the cutting of the tendon were painful; cocaine-narcosis was therefore sufficient for ordinary tenotomy, but for advancement chloroform was preferable.

FIEUZAL (132) employed cocaine in operations, both as a mydriatic and as an anæsthetic. In a case of enucleation he produced such complete anæsthesia by injection of cocaine into the conjunctival tissue and instillations into the conjunctival sac, that the patient did not feel any pain.

EMMERT (136) made use of cocaine for experimental, diagnostic, and therapeutic purposes. It is well adapted for experimental, operative, and diagnostic purposes in man, as it dilates the pupil and does not affect the accommodation. As a remedial agent it dilates the pupil, raises the lid, contracts the blood-vessels, and produces anæsthesia; it is most valuable, however, as an anæsthetic for operations upon the surface of the globe.

MEYER (137) lets a drop of a two-per-cent. solution of cocaine fall once or twice upon the cornea for producing anæsthesia, and then keeps the eye open for a short time, so as to obtain a full effect. Even so small a quantity is quite sufficient. Before abscising the iris in iridectomy, he lets fall a few drops upon the iris from his lachrymal syringe, after the incision has been made. A subcutaneous injection of cocaine is useful in Snellen's ectropium-suture. Meyer advises not to inject more than 0.02, as even this small dose, as he found in himself and others, is sufficient to produce slight nausea, in one case even pallor of the face, cold perspiration, and nausea. Meyer does not inject cocaine into the orbit; he prefers exenteration or neurotomy to enucleation and chloroform-narcosis for operations on the lids.

v. MITTELSTÄDT.

PIERD' HOUY (138) and LUNDY (134) have experimented with oleate of cocaine, and found that this preparation by no means equals the hydrochlorate in quickness and intensity of action.

DANTONE.

FRANK (140) did not observe any change in the electric irritability of the motor area of the cerebral cortex after the local application of cocaine. v. MITTELSTÄDT.

PANAS (141) prefers chloroform-narcosis in timid, nervous persons and in children; also in complicated cataracts. Panas is in favor of deep narcosis, and opposed to the mixed narcosis of morphine and atropine proposed by Gayet (*Arch. d'ophth.*, vol. iv., No. 5, p. 385). v. MITTELSTÄDT.

TERRIER (142) read a paper of Dransart, recommending chloroform and cocaine, in order to shorten the narcosis, and thus lessen its dangers where deeper parts (iris, optic nerve, etc.) are concerned. v. MITTELSTÄDT.

RAMPOLDI (144) saw a very annoying hyperæsthesia of the retina, accompanied by a reflex spasm of the lids, disappear in a few days under the use of cocaine. It had existed for seven months and had rendered the patient unfit for any kind of work.

DANTONE.

LAWRENCE TURNBULL (145) gives a history of the botanical character, physiological effects, and chemical constituents of coca erythroxylon, and an account of the introduction of the muriate as an anæsthetic, with a review of the publications up to date.

BURNETT.

LYONS (146) has produced this new salt of cocaine, which he

thinks will have an advantage over others in use, in so far as it is obtained in the form of crystals and is not deliquescent.

BURNETT.

CALHOUN (148) enucleated an eye, which had been wounded with a knife, after having injected the tissues of the orbit with cocaine. But little pain was experienced, though there was depression of the circulation, which required the administration of stimulants. BURNETT.

TAYLOR (148) has found the hydrochlorate of cocaine prompt in relieving acute catarrhal conjunctivitis, usually after three or four applications. BURNETT.

LITTLE (149) instilled a drop of a two-per-cent. solution of cocaine to allay pain, and facilitate handling of the eye. In twenty minutes both upper and lower eyelids were free from œdema, and the chemosis of the conjunctiva was markedly diminished. This condition was maintained by occasional repetitions of the anæsthetic, though it did not prevent a perforation of the cornea. BURNETT.

WILSON (150) reports that after making an iridectomy under cocaine, and using it in lieu of atropine for twenty-four hours, the cornea became hazy and pitted in appearance. On the use of atropine, the opacity cleared up. The same thing occurred in a case of discission of soft cataract in a child ten months old.

BURNETT.

CARERAS ARAGO (151) obtained good results by instilling cocaine in cases of lymphatic, vascular and ulcerous conjunctivitis and kerato-conjunctivitis; also in a case of syphilitic iritis, in which by the alternate use of cocaine and atropine an adhesion was torn which had resisted atropine alone.

According to the observations of KÖNIGSTEIN (152), cocaine acts beneficially in phlyctenular affections, and allays pain in herpes zoster, iritis, cyclitis, glaucoma, and neuralgic ocular affections. Cocaine acted directly upon the sympathetic nerve in the case of a woman suffering from paralysis of the sympathetic nerve of the right side.

FODOR (153) used cocaine in substance and in a three-per-cent. solution in a case of exenteration of the globe on account of panophthalmitis. The patient felt no pain.

JUST (154) calls special attention to the reduction of the intraocular pressure following the instillation of cocaine.

WICHERKIEWICZ (155) found that repeated instillations of a

stronger solution of cocaine reduced the sensibility of the iris also.

COHN (156) found that when there is chemotic thickening and intense injection of the conjunctiva, the condition is not materially affected by cocaine.

KEYSER (133) reports that in seven extractions of cataract which he has made under cocaine, panophthalmitis took place in three, and in one other there was hemorrhage into the anterior chamber. The solution he used was free from micrococci.

BURNETT.

PECK, STEVENS, and MINOR (157) saw peculiar symptoms of collapse after injection of cocaine, similar to those previously observed by Knapp.

MAYERHAUSEN (158) reports that instillation of about fifteen drops of a two-per-cent. solution of cocaine into the conjunctival sac of a girl twelve years old produced irritation in the throat and nausea; the patient was also very listless and tired. These symptoms disappeared after the lapse of twenty-four hours.

XII.—IRIS.

BY DR. NIEDEN.

159. DERBY, H. Iridectomy in chronic iritis. *Trans. Amer. Ophth. Soc.*, 1884.

160. FRANKE. Clinical statistics as to the persistent pupillary membrane. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 289.

161. GALLENGA. Osservazione di trapianto dell' epitelio corneale sull' iride. *Giorn. de R. Acc. d. Med. di Torino*, vol. xlviii., 1, 2, 1885.

162. MITTENDORF, W. F. Multiple colobomata of the iris or polycoria congenitalis. *Trans. Amer. Ophth. Soc.*, 1884.

FRANKE (160) found among 3,508 patients, 32 cases (0.9 per cent.) of persistent pupillary membrane. In 14 it was a membrane, in 18 he found only filaments of iris, in 3 cases in both eyes; as was frequently observed, probably the result of the checked growth of the whole eye, which also explains the existence of the pupillary membrane. It occurred in the ratio of 7 cases in the right eye to 5 in the left, and in the female sex in the ratio of 19 to 13 in the male. In 2 cases opacities of the posterior capsule and cortex were also observed. He adds an accurate bibliography.

GALLENGA (161) reports an interesting case of migration of tissue. He found on a piece of iris which he excised in an operation for traumatic cataract, and which was adherent to the corneal scar, besides remnants of blood, pigment-cells, and newly formed connective tissue, a layer of pavement-epithelium covering the anterior surface, firmly united with the membrane and arranged in strata like the corneal epithelium. On another portion of iris which he also excised, but which was not adherent to the cornea, he found no epithelium. The author believes this to be the first case observed in man, and that its development was similar to that of the cysts of the iris. He also mentions two cases of imperfectly developed eyelashes growing from corneal scars which he observed at the clinic at Turin. DANTONE.

MITTENDORF (162) observed two cases of multiple colobomata of the iris occurring in father and daughter. There was no arrest of development in any other part of the eyes. The daughter had compound myopic astigmatism, but $V = \frac{20}{20}$ after correction. In the father, besides the central pupil, there were two below, one larger than the central one, and one smaller situated close to it, both reaching to the periphery of the iris. In the daughter, besides the central one, which was oval, there were four—all at the periphery; one below, one very small one above, one up- and out-ward, and one inward and below. BURNETT.

DERBY (159) gives the history in detail of a case of recurrent iritis in a woman sixty years of age, followed in its varying features through four years. Finally a double iridectomy was performed (but not by the author). For three months after the operations the attacks of inflammation continued, one occurring each week, then gradually ceased. The author is inclined to think that the disease ceased of self-limitation and not on account of the operations. The annoyances from the iridectomies (intolerance of light, etc.) were very great. BURNETT.

XIII.—CHOROID.

163. ALT. Two cases of exudative choroiditis with subsequent detachment of the retina. *Amer. Journ. Ophth.*, Dec., 1884.

164. DUJARDIN. Un cas d' hydrophthalmos congènital. *Journ. de soc. de méd. de Lille*, 1885, vol. v., p. 142.

165. HIRSCHBERG and BIRNBACHER. On metastatic carcinoma of the choroid. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 113.

166. NIEDEN, A. Two cases of spontaneous recovery from

affections of the uveal tract after facial erysipelas. *C. f. A.*, vol. ix., p. 80.

ALT (163) gives the histories of two cases of exudative choroiditis in detail, and raises the question whether the detachment of the retina is due to the remedies employed for the choroiditis (iodide of potassium 10 grs. t. i. d.), or to a change in the character of the choroiditis from a plastic to a serous. In both cases the detachment of the retina subsided under the use of injections of pilocarpine. BURNETT.

HIRSCHBERG and BIRNBACHER (165) review briefly the four cases thus far reported of carcinomatous metastasis of the choroid, and add an accurate macro- and micro-scopic description of a new case.

NIEDEN (166) saw in two cases of serous iritis and disseminate choroiditis, respectively, after a severe attack of facial erysipelas, such marked improvement of the ocular affection, that a causal connection between absorption of the exudation and recovery from the erysipelas seems beyond doubt, especially as in one of the cases he saw a renewed affection of Descemet's membrane after reconvalescence from the erysipelas. Nieden, however, utters a warning against the introduction of erysipelas as a therapeutic agent, as has recently been proposed by Cocci.

XIV.—GLAUCOMA.

167. COGGIN, D. D. Glaucoma produced by atropine. *Amer. Journ. Ophth.*, Jan., 1885.

168. JACOBSON, J., Sen. Cases of glaucomatous affections. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 157.

169. NOVELLI. Allungamento e strappamento del nervo nasale esterno nella cura del glaucoma. *Boll. d' ocul.*, vol. vii., 6–9, Feb.–May, 1885.

170. PARINAUD. Traitement du glaucome par la paracentèse scléroticale. *Soc. franç. d' ophth.*, Jan. 29, 1885.

171. TERSON. De la scléro-iridectomie dans le glaucome. *Soc. franç. d' ophth.*, Jan. 26, 1885.

JACOBSON (168), after some polemics directed against Mooren's views on glaucoma, endeavors to harmonize the views on some of the questions, and comes to the conclusion that in ordinary glaucoma the amblyopia is the consequence of the excavation. The

latter is due to an increase of the intra-ocular pressure. The diagnosis of chronic glaucoma does not depend upon the presence of a marginal excavation. The cause of the increased pressure is found in the absorption of liquid by the vitreous. The disturbances of color perception are due to ascending atrophy of the optic nerve.

In COGGIN'S (167) case, the attack developed suddenly after atropine (one per cent.), which had been used once or twice. Slight improvement under eserine. BURNETT.

NOVELLI (169) analyzed the thirty-four cases of stretching or tearing of the N. infratrochlearis in glaucoma or ciliary neuralgias, performed by Badal, Abadie, Kacamrow, Masini, and Simi, and comes to the following conclusions : the operation in question only reduces the ciliary pains in glaucoma ; it has, however, only very slight influence on the intra-ocular pressure and on vision. In some cases there was an improvement, even when iridectomy and sclerotomy had failed, in others the condition was made worse. The new operation cannot, therefore, be compared in its results with those of iridectomy and sclerotomy. DANTONE.

PARINAUD (170) has performed paracentesis of the sclera with good results in several cases of glaucoma. Without using a speculum or fixation-forceps he plunges a Graefe knife through the sclera between the inferior and external recti muscles, 8 to 10 *mm.* from the corneal margin, turns it through 90°, and then draws it out, leaving a triangular wound. He operated successfully three cases according to this method : 1. A case of acute glaucoma. 2. A case of acute glaucoma, with posterior synechiæ; no relapse after two years. 3. A case of painful absolute glaucoma, with an anterior synechia and ectasia of the sclera ; here four paracenteses were necessary ; no relapse after two years. 4. In a case of hemorrhagic glaucoma paracentesis and iridectomy, performed ten days later, failed. MARCKWORT.

TERSON (171) recommends a combination of sclerotomy and iridectomy against glaucoma. Terson makes an incision as in sclerotomy, the portion of the section at the point of entry being sufficiently wide to allow him to seize the iris, draw it out, and cut it off. MARCKWORT.

XV.—SYMPATHETIC OPHTHALMIA.

172. FANO. Documents pour servir à l'histoire de l'ophthalmie sympathique. *Journ. de l'ophth.*, Jan.–April, 1885.

173. Risley, S. D. A case of sympathetic neuro-retinitis, with consecutive serous iritis. *Journ. Amer. Med. Ass'n*, Jan. 10, 1885.

174. Fox, L. Webster. Clinical history of a case of sympathetic ophthalmia. *Trans. Amer. Ophth. Soc.*, 1884.

Risley's (173) patient was a boy of fourteen years, who was struck on the left eye by the arrow of a blow-gun, making a wound at the sclero-corneal junction. There was prolapse of iris, which was excised. In about two months the optic disc of the right eye began to show signs of congestion, but there were no signs of inflammation elsewhere. V was correspondingly reduced. Soon afterwards, however, punctate deposits were seen on the posterior surface of the cornea. He was treated with the mercurial bandage. In a month the eye had cleared, and $V = \frac{20}{20}$. He subsequently had another attack of neuritis, associated with convulsions, but recovered V under the same treatment as before.

Burnett.

Webster Fox (174) reports the case of a boy twelve years of age, who received a cut with a knife in the ciliary region of the left eye, which resulted in loss of V in twenty-four hours, from closure of the pupil. In eighteen days the fellow-eye became affected, and in three weeks from the reception of the injury V was lost from iritis. In six months atrophy of the left globe had taken place, and a like condition was beginning in the other.

Burnett.

XVI.—LENS.

175. Alt, A. Cataract-extraction followed by death. *Amer. Journ. Ophth.*, Feb., 1885.

176. Baker, A. R. Report of twenty-seven consecutive cases of senile cataract operated on by the v. Graefe modified linear extraction. *Amer. Journ. Ophth.*, Jan., 1885.

177. Birnbacher, Alexis. On phakocele. *v. Graefe's Arch. f. Ophth.*, vol. xxx., 4, p. 103.

178. Bos, E. Des cataractes syphilitiques. *Thèse de doct. de Bordeaux*, July, 1884.

179. Dickey, J. L. A case of congenital ectopia lentis. *Amer. Journ. Med. Sci.*, April, 1885.

180. Gallenga. Secondo contributo alla studio della maturazione artificiale della cataratta. *Gazz. de cliniche*, 1885, Nos. 4 and 5.

181. LANDESBERG, M. On nephritic cataract (Deutschmann), *v. Graefe's Arch. f. Ophth.*, vol. xxx., 3, p. 143.

182. TEILLAIS. De la luxation spontanée du cristallin. *Soc. franç d'ophth.*, Jan. 27, 1885.

183. WALDHAUER, Père à Mitau. Quatre cas de cataracte diabétique. *Rev. gén. d'ophth.*, 1885, vol. iv., No. 1, p. 1.

184. WEEKS, S. H. Monocular diplopia. *Trans. Amer. Med. Ass'n*, 1884.

BIRNBACHER (177) describes a case of dislocation of the lens, after an ulcerous perforation of the cornea; the lens, still partly clear, appearing like a button in the perforation. The corresponding portion of the uninjured capsule and cicatricial iris-tissue protruded like a hernia. Probably this condition frequently occurs in simple prolapse of the iris after an extensive perforation of the cornea.

Bos (178) describes a rare form of soft cataract, which develops in syphilitic individuals in the secondary stage without any other symptoms, ripens rapidly, but can be checked by energetic antisyphilitic treatment, which is necessary even when an operation is performed. Three cases in young persons. v. MITTELSTÄDT.

LANDESBERG (181) has repeated Deutschmann's investigations on the presence of albumen in the urine in cataract. He examined 376 individuals and found the urine normal in 327, while among 49 he found sugar in 3, sugar and albumen in 2, and albumen only in 44. The results of the microscopic examination were negative in 27 cases, 5 times he found cystitis and twice chronic pyelitis, etc. Of course the presence of albumen in the urine is of no pathognomonic significance, so there were only 17 cases of genuine complications. Thc question of causal connection is therefore still an open one.

DICKEY'S (179) patient when first seen was a girl of thirteen years, with V = $\frac{3}{200}$ in the right and $\frac{2\frac{1}{2}}{200}$ in the left eye. The lens in the R was dislocated upward and inward, occupying about one fourth of the pupillary space; in the L it was directly upward. With + 13 ⊂ + 3c ax 90° V was brought up to $\frac{15}{60}$ in the R, to $\frac{15}{70}$ in the L. The eyes of her ancestors, as far as ascertainable, were good.
BURNETT.

TEILLAIS (182) discusses the etiology of dislocation of the lens, and proposes to classify them as follows: 1, spontaneous; 2. secondary or consecutive; 3, traumatic dislocations. In the discussion which followed Abadie, Gayet, Armaignac, and Prouff ad-

vised extraction of the dislocated lens, while Nicati fears the escape of vitreous. MARCKWORT.

WEEKS (184) reports the case of a boy who received a blow on the bridge of the nose from a bat. Two days after he noticed diplopia. On examination it was found to be monocular, and in the author's opinion was due to irregular astigmatism from dislocation of the lens. The diplopia disappeared on placing a stenopaic slit vertically before the eye. BURNETT.

ALT (175) operated for cataract on a man eighty years old. He was obliged to extract it with a spoon. The wound healed after some keratitis. Twelve days after, he died, apparently from exhaustion. There were no signs of septic infection. The author seems doubtful as to the operation being the cause of death.

BURNETT.

BAKER's (176) results were: eight had $V = \frac{20}{30}$. None were lost, and only one had $V = \frac{20}{100}$. BURNETT.

WALDHAUER (183) reports four extractions of diabetic cataract which healed well. He advises caution in pressing out the cortical masses, as the zonula and hyaloid seem to tear very easily in such cases. V. MITTELSTÄDT.

GALLENGA (180) reports fourteen additional cases of artificial ripening of cataract. In eleven Förster's method of friction of the capsule was adopted; in three, puncture of the capsule. The author concludes that neither method is dangerous, and that under some conditions—for instance, leucoma of the cornea—simple paracentesis of the cornea is preferable to iridectomy. The methods of ripening cataract do not always prevent the formation of secondary cataract and the operations which this necessitates.

DANTONE.

XVII. VITREOUS.

185. HÄNSELL. Recherches sur le corps vitré. *Bull. des quinze-vingts*, 1884, p. 170.

HÄNSELL (185) examined three enucleated eyes, and found that glioma spreads not only by displacing the vitreous, but also by developing and proliferating in it. As the glioma develops from cells of the vitreous, which pass into a kind of embryonic condition, it is not a neoplasm of the nervous tissue exclusively.

V. MITTELSTÄDT.

XVIII. RETINA AND FUNCTIONAL DISTURBANCES.

186. AUGIER et DUJARDIN. Gliome de la rétine. *Jour. des sci. méd. de Lille*, 1885, p. 89.

187. AYRES, S. C. Anæsthesia of the retina. *Amer. Journ. Ophth.*, Jan., 1885.

188. FULTON, F. Case of retinal hemorrhage, apparently due to simple anæmia. Remarks. *Amer. Journ. Ophth.*, Feb., 1885.

189. HOFFMANN, F. W. Embolism of a branch of the central retinal artery, with a hemorrhagic infarctus. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxii., p. 24.

190. LITTLE, W. S. A case of glioma of the retina (double-congenital). *Trans. Amer. Ophth. Soc.*, 1884.

191. MASSEY, E. BELTON. Report of a case of sudden loss of vision following anæsthesia of the fifth nerve, etc. *Journ. of Nerv. and Ment. Dis.*, Oct., 1884.

192. RUMSZEWICZ. Un cas de colobome maculaire. *Rev. gén. d'ophth.*, 1885, vol. iv., No. 71, p. 159.

193. SCHELL, H. S. A case of embolism of the retinal artery. *Trans. Amer. Ophth. Soc.*, 1884.

194. WOLFE. Traitement du décollement de la rétine. *Ann. d'ocul.*, vol. xciii., p. 16.

FULTON (188) reports a case of retinal hemorrhage. It was monocular, and occupied the region of the macula lutea. No other cause but anæmia could be assigned, which, to the reviewer's mind, seems doubtful, since it only affected one eye. Eye-troubles from general causes are, as a rule, binocular; in pernicious anæmia this is always the case. BURNETT.

HOFFMANN (189) observed a case of embolism of the central retinal artery, with hemorrhagic infarctus, in a patient fifty years old, who suddenly became blind in the left eye, after prodromal symptoms extending over many years. The appearance of the fundus was characteristic. The cause must be sought in atheroma of the blood-vessels. The hemorrhages are due to collateral influx. In the right eye there was a neuritic process at the edge of the disc.

SCHELL (193) is inclined to regard a case of sudden loss of vision in the left eye as one of embolism of the retinal artery, in which the plug did not entirely fill the lumen of the vessel. The veins could be completely emptied by massage of the eyeball, a regular current of blood being established some minutes after. There was mitral insufficiency and hypertrophy of the left ventricle. BURNETT.

RUMSZEWICZ (192) found such a small central scotoma in the

case of coloboma of the macula lutea, that only a partial absence of the retina in the region of the coloboma could be assumed. Measurement of its fundus with the ophthalmoscope showed a marked excavation ; besides three scleral or choroidal blood-vessels, it contained only traces of pigment.

AUGIER and DUJARDIN (186) observed a case of glioma in both eyes in a child nine years old. The left eye, in which the glioma had advanced farthest, was enucleated on account of the pain. Death a month and a half later. V. MITTELSTÄDT.

LITTLE (190) reports a case of glioma of the retina in which nothing wrong was noticed in the eyes until the child was five months old. At the end of a year the child was entirely blind. An operation was refused, the tumors gradually increased in size, and the child died at the age of 2 years and 7 months. No *post-mortem.* BURNETT.

WOLFE (194) insists that before operating for detachment of the retina it is necessary first to determine, by inclining the head in various directions, that point at which the subretinal liquid has the greatest tendency to collect, and then to make the incision. He operates in the following manner : After the patient has been chloroformed, he makes a vertical incision through the conjunctiva 12 to 13 *mm.* long, in the region of the detachment, holds the edges of the wound apart with squint-hooks, and rotates the globe to such an extent that a broad needle can be passed through the sclera at the point at which the liquid collects most easily. The needle is then withdrawn without inclining it. If he has reason to suppose that not all of the liquid has escaped, he introduces a silver spatula, and carefully allows the scleral wound to gape a little. After the conjunctival wound has been closed with one or two sutures—sometimes without any,—the eye is bandaged, and the patient kept quiet, as after cataract-operations.

In the *Ann. d'ocul.*, vol. xci., p. 149 (*cf. Arch. f. Augenhk.*, vol. xiv., Rev. No. 340), WOLFE published a case, operated in the manner described above, two weeks after the operation ; in an annotation to the paper just reviewed, he remarks that the condition of the eye in question is thus far (beginning of 1885) very satisfactory. MARCKWORT.

AYRES (187) reports three cases of anæsthesia of the retina, two of which were undoubtedly hysterical. There was marked contraction of the visual field in both cases, and they improved greatly and very promptly under hypodermic injection of strychnia.

The third was in a school-girl of sixteen, who was apparently in perfect health. BURNETT.

MASSEY'S (191) patient, a man forty-eight years of age, was stung on the left cheek by a honey-bee, which was followed by increasing numbness of that side of the face. Two years later the V of the left eye was noticed to become impaired, and in ten days it was totally lost. Dr. Thompson, of Philadelphia, found the disc white, T normal, no glaucoma. R eye, V = $\frac{20}{20}$. A year afterwards the right eye began to fail, and in a week was entirely blind. The ophthalmoscope showed no important changes at the fundus. BURNETT.

XIX.—OPTIC NERVE.

195. BURNETT, SWAN M. Clinical contributions to the study of retrobulbar affections of the optic nerve. *Amer. Journ. Ophth.*, March–April, 1885.

196. FUCHS, E. Lésions anatomiques dans l'atrophie des nerfs optiques. *Soc. franç. d'ophth.*, Jan. 27, 1885.

197. HARLAN, G. C. Two cases of swelling of the optic papilla, possibly congenital. *Trans. Amer. Ophth. Soc.*, 1884.

198. KNAPP, H. Two cases of neuroretinitis, with almost sudden loss of sight in both eyes. *Trans. Amer. Ophth. Soc.*, 1884.

199. NORRIS, W. F. Hereditary atrophy of the optic nerves. *Trans. Amer. Ophth. Soc.*, 1884.

200. VOSSIUS, A. Contribution to the knowledge of the congenital coni. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxii, p. 137.

201. WADSWORTH, O. F. A case of myxœdema, with atrophy of the optic nerves. *Trans. Amer. Ophth. Soc.*, 1884.

FUCHS (196) found that atrophy of the optic nerve begins at its periphery, and sometimes also affects primarily a few central fibres ; this atrophy, which sometimes occurs in children, is easily overlooked, as, owing to the course of the affected fibres, the blind spot is only slightly enlarged, and the visual field a trifle contracted. MARCKWORT.

BURNETT (195) observed the following cases : Case 1.—Blindness of left eye, rapidly becoming total, followed by atrophy of the disc ; return of V in the upper and the lower inner portion of the field ; paralysis of the 1, 3, and 7 nerves of the left side ; partial

recovery under anti-syphilitic treatment and electricity. Case 2.—Inflammation, probably rheumatic, within the orbit.; abscess; signs of optic neuritis; atrophy of disc; V = 0. Case 3.—Exophthalmus and paralysis of all the muscles of the right eye; absolute blindness; disappearance of the exophthalmus and paralysis under anti-syphilitic treatment; return of some V; white atrophy of the disc; antecedent white atrophy, with loss of the V in the left eye, with complete ophthalmoplegia.

BURNETT.

HARLAN (197) observed two cases of swelling of the optic papilla, possibly congenital. In the first there was M of 3.50 D at the macula, and $V = \frac{20}{16}$; no asthenopia; discs swollen to the extent of 3 or 4 D. In Case 2 there was H of 1.5 D, with a swelling of the disc of 1.5 D; $V = \frac{20}{20}$. In both cases there were the appearances of beginning papillitis. BURNETT.

In neither of KNAPP'S (198) cases, neuroretinitis with almost sudden loss of sight, was there any constitutional affection, though in Case 1 it was thought at first that there was uræmic poisoning. In this case the blindness was permanent, except a small island in the nasal field of the right eye. In the second case vision was completely restored in a month. BURNETT.

NORRIS (199) has had the unusual opportunity of examining the eyes of three generations, in whom atrophy of the optic nerves was hereditary. In the younger generation of seven children all were affected, while their parents were not. The condition, however, was present in the great-grandmother, a granduncle, an uncle, and several cousins. The disease came on as early as the eighth and as late as the thirty-fifth year, and was usually of gradual development. The symptoms were frequent frontal headaches and gradual loss of central vision. There was contraction of the visual field for form—yellow, blue, and red, and in the order given. The ophthalmoscope showed three stages of development: (1) that of cloudy and œdematous swelling, (2) that of lymph-reflexes along the course of the retinal blood-vessels, and (3) that of gradual death of the nerve-tissue. Two of the cases ended in total blindness, and some improved under the use of strychnine.

BURNETT.

VOSSIUS (200) has compiled the literature of the occurrence of coni of the fundus, to which he adds the cases observed by himself. Among 1,655 eyes with anomalies of refraction (M, 741; H, 623; Am, 124; Ah, 140; A. mixt., 27) he found 425 coni

= 25.68 %. Among these were 231 with the coni on the temporal side, 83 with circular coni, 75 with coni downward, 9 with coni on the nasal side, 8 with coni downward and inward, 8 with coni upward and outward, 6 with coni downward and outward, 5 with coni upward. Among the 231 eyes with coni outward there were 222 myopes = 96.1 %, and 9 hypermetropes = 3.9 %. In 25 cases the conus downward was found in both eyes, in 25 in only one eye; among 13 of the latter a conus was also found in another direction; of the remaining cases the other eye was normal in but 5. The conus downward is probably a remnant of the fœtal fissure, and the coni are rudimentary colobomata of the papilla.

WADSWORTH (201) observed a case of myxœdema with atrophy of the optic nerves. In the right eye there was only perception of light; in the left, V = $\frac{20}{40}$. The visual field was contracted in all directions, but mostly upward and outward. The discs were sharply defined, gray, with a bluish tinge; central vessels small.

BURNETT.

XX.—INJURIES AND FOREIGN BODIES (PARASITES).

202. AUB, J. Removal of foreign bodies from the vitreous by aid of the electro-magnet. *Trans. Amer. Ophth. Soc.*, 1884.

203. DEHENNE. Considérations sur les traumatismes oculaires. *Rec. d'ophth.*, Jan., 1885, p. 1.

204. DUJARDIN. Éclat de fer dans la chambre antérieure; extraction avec électro-aimant. *Journ. des sci. méd. de Lille*, 1885, No. 1, p. 1.

205. MEYER, ED. Éclat metallique dans l'humeur vitrée extrait par l'électro-aimant avec rétablissement de la vision. *Soc. franç. d'ophth.*, Jan. 29, 1885.

In four cases reported by AUB (202) there was only one failure; in all the others the eyeball and a considerable amount of V were retained (from $\frac{20}{20}$ to $\frac{20}{70}$). In none of the cases was the attempt at removal made immediately after the accident. BURNETT.

DEHENNE (203) discusses various kinds of injury to the eye, and reports the clinical history of seventeen cases of more or less interest. Dehenne uses a Graefe knife for synechiotomy instead of synechiotomes. In regard to the treatment of serpent ulcer, Dehenne prefers cauterization with the thermo-cautery to Saemisch's operation. MARCKWORT.

DUJARDIN (204) extracted with the electro-magnet a chip of

iron 2 *mm.* long, which had become wedged in the angle of the iris in the upper outer quadrant, where it had been for eight days. Rapid recovery. v. MITTELSTÄDT.

MEYER (205) reports a case of extraction of a chip of iron from the vitreous with the electro-magnet. The eye was not only preserved, but also retained V = $\frac{20}{30}$. The opacities of the vitreous cleared up very rapidly, and Meyer asks if this may have been due to the introduction of the electro-magnet. Referring to this case, Gorecki discusses the beneficial influence of a weak constant current on opacities of the vitreous. MARCKWORT.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

206. ESKRIDGE, J. T. Tumor of the cerebellum with monocular hemiopia. *Journ. of Nervous and Mental Diseases*, Jan., 1885.

207. FÉRÉ, CH. Trois autopsies pour servir à la localisation cérebrale des troubles de la vision. *Arch. de neurol.*, March, 1885, No. 26, p. 222.

208. HALLAPEAU, H. Essai de localisation d'une cécité accompagnée d'hemichorée. *L'encéphale, Ser. A.*, No. 2, March–April, 1885, p. 182.

209. HENNIUS and HIRSCHBERG. Binocular blindness due to puerperal infection. *C. f. A.*, vol ix., p. 84.

210. HIRSCHBERG, J. A rare case of septic embolism of the eye observed in a child, due to ulcerous endocarditis. *C. f. A.*, vol. ix., p. 33.

211. HIRSCHBERG, J. A case of rheumatic embolism of both eyes in a child. *C. f. A.*, vol. ix., p. 35.

212. JONES, E. W. Retinal hemorrhage in malarial fevers. *Med. Rec.*, June 27, 1885.

213. LAURE. Une observation de cécité des mots à l'exclusion des chiffres et des nombres écrits en chiffres. *Soc. de méd.-chir. de l'hôp. de Lyon*, 13, vol. ii., 1885. *Lyon méd.*, No. 12, p. 430.

214. LEDDA. Ambliopia bilaterale temporano da infezione malarica. *Spallanzani*, vol. xiv., April 4, 1885.

215. NORTON, G. S. The eye as an agent causing headaches and other nervous disturbances. *The Hahnemannian Monthly*, January, 1885.

216. PALMER, S. E., and SPALDING, J. A. Induction of

premature labor in a case of albuminuric retinitis. *Trans. Maine Med. Ass'n*, 1884.

217. PATROUILLARD. Urine à alcaptose. *Journ. des sci. méd. de Lille*, 1885, p. 83.

218. PICQUÉ. Note sur un cas d'affection hépatique ancienne réveillé à la suite d'un traumatisme de l'œil. *Gaz. méd. de Paris*, 1884, p. 64.

219. PITRES. Considérations sur l'agraphie à propos d'une observation nouvelle d'agraphie motrice rare. *Rev. de méd.*, Nov., 1884.

220. WEBSTER, D. A case of double optic neuritis from chronic cerebral meningitis. *Amer. Jour. Ophth.*, Dec. 15, 1884.

221. WILBRAND, H. On concentric limitation of the field of vision, and functional disturbances of the cortex of the cerebrum, and on the dissimilarity of hemianopic defects of the visual field. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 73.

ESKRIDGE's (206) patient was a woman thirty-two years of age, with symptoms pointing to a gross lesion of the brain. On the part of the eye there was double optic neuritis. In the right eye the visual field was free, but in the left there was a temporal hemianopsia which extended quite up to the middle line. On post-mortem a nodular tumor the size of a horse-chestnut was found resting on the upper surface of the right lateral hemisphere of the cerebellum. BURNETT.

In FÉRÉ's (207) first case, with hemiplegia, hemianæsthesia, and concentric limitation of the visual field, the autopsy revealed: atrophic degeneration of the left pedunculus cerebri, an old apoplexy laterally from the nucleus lentiformis, extending backward through the course of the sensitive fibres, and downward below the third frontal convolution; the two posterior thirds of the inner capsule with the adjacent nucleus lentiformis were of a brownish-yellow color. In the second case, of partial word-blindness, complete sound-blindness, partial aphasia, and right-sided hemiplegia with contractions, where there was also hemianopic limitation of the upper portion of the right side of the visual field without implication of the point of fixation, he found a structural change in the lower portion of the upper parietal lobe, which extended as far as the lower parietal lobe. In the third case there was right-sided temporary hemiplegia and permanent hemianopsia, the line of demarcation passing through the point of fixation,

therein differing from the general type of cerebral hemianopsia, in which the point of fixation is not affected. He found a lesion of the lower surface of the occipital lobe. Féré assumes, like Charcot, in most cases of cerebral amblyopia, a lesion of the posterior third of the inner capsule (carrefour sensitif) of the opposite side, but a cerebral hemianopsia he thinks cannot be located with an equal degree of certainty. He believes, however, that variations in the crossing of the fibres within the visual sphere may produce clinically different symptoms in different individuals with the same lesion, so that in one case hemianopsia, in another amblyopia, or both, may be the result. Féré supports this view by pointing to the anomalies of the gray (Meynert's) commissure and the crossing of the fibres in the pyramids.

v. MITTELSTÄDT.

HALLAPEAU (208) observed, in a man 83 years old, with stenosis of the aorta, sudden blindness in both eyes, together with choreiform movements of the left side of the body and rotary movements. The patient was perfectly conscious; there was no paralysis, no disturbance of sensibility; the movements of the eyes were not affected; the pupils, slightly dilated, immovable. There were no ophthalmoscopic changes. This condition disappeared entirely in the course of a few days, with the exception of a slight dimness of vision. The author localizes the affection in the anterior corpora quadrigemina; there was probably an embolism of the arteries of the right side supplying the anterior portions of the corpora quadrigemina.

v. MITTELSTÄDT.

LAURE (213) observed word-blindness in a woman 74 years old, which, however, was not noticeable for numbers. At first there was a hemiplegia of the right side (apoplexy) lasting eight days, followed by aphasia lasting three months, and then disappearing, with the exception mentioned above. There were also symptoms of an affection of the brain and spinal cord, of which there persisted only weakness of the right side and impairment of intelligence and memory. v. MITTLESTÄDT.

PITRES (219) recognizes three kinds of agraphy: 1, due to word-blindness; 2, due to word-deafness; 3, motor agraphy, or graphoplégie. Each one of these varieties can occur in patients psychically unaffected. The third form is the rarest. In most forms of agraphy there is hemiplegia and aphasia.

v. MITTLESTÄDT.

In WEBSTER'S (220) case there were the usual ophthalmoscopic signs of double optic neuritis, accompanied with severe headache, which had continued for some years. No important changes were found in the urine. $V = \frac{20}{200}$, color-blind. On post-mortem evidences of chronic meningitis were found. BURNETT.

WILBRAND (221) concludes from his investigations (*q. v.*) on concentric limitations of the field of vision in functional disturbances of the cortex of the cerebrum, that when such occur in one centre of vision they produce temporarily, either a total loss of function or concentric limitations of the visual field in the homonymous halves of the retinæ co-ordinated to the affected centre. The extent and similarity of the concentric limitation of the visual field in functional disturbances of both visual centres is dependent upon (1) the area of one visual centre compared with that of the other; (2) on the proportion between the individual smallest fascicular surfaces of the lateral and those of the crossed fascicle, and on the intensity of functional disturbance of each visual centre.

NORTON (215) gives the histories of twenty-eight cases in more or less detail, showing the connection between the various forms of refraction and headache, or other nervous disturbances.

BURNETT.

HENNIUS' (209) observation was that of a woman who became blind in both eyes from metastatic iridochoroiditis, due to puerperal affection, in nine and twenty days respectively; her life, however, was saved. This is the first case of its kind reported.

HIRSCHBERG (211) describes a case of metastatic iridochoroiditis, observed in a child with typhoid symptoms, which terminated fatally. It was due to ulcerous endocarditis, the result of preceding rheumatism of the joints and consecutive mitral insufficiency.

HIRSCHBERG (210) reports a case of septic embolism, after rheumatism of the joints, observed in a child one and a half years old, from which it recovered, followed by exudative purulent iridochoroiditis, and later, dislocation of the lens of one eye. No organic lesion of the heart could be detected afterwards.

JONES (212) observed in all, twelve cases in which hemorrhage in the retinà accompanied malarial fevers. The hemorrhages usually occur after the first week of illness. In only one case did atrophy of the nerve occur. His treatment was quinine, ergot, and iron. BURNETT.

LEDDA (214) saw atrophy of the optic nerve in a person much reduced by malaria, with bilateral temporal amblyopia.

DANTONE.

The medical history (216) is by Dr. PALMER. The induction of premature labor was followed by a return of vision, with disappearance of the retinitis. Dr. SPALDING adds to this history a valuable abstract of all reliable cases of a similar nature hitherto published in prominent journals. BURNETT.

PATROUILLARD (217) found in a woman with paralysis of the muscles of the right eye 6.1 *grms.* sugar per litre in the urine. This sugar, however, produced no defection of polarized light. Patrouillard classifies this kind of sugar with the substance called alcaptose. V. MITTELSTÄDT.

PICQUÉ (218) saw symptoms of an affection of the liver follow a blow upon the eye, resulting in blindness, without any attending pain, in an apparently healthy man, forty-four years old; ascites, icterus, diarrhœa. Death two weeks later. The liver was enlarged, its surface partly granular, and united with the peritoneum. Picqué thinks that this case tends to confirm Verneuil's views of the evil influence of injuries on existing visceral affections.

V. MITTELSTÄDT.

MISCELLANEOUS NOTES.

The **A. v. Graefe** prize, founded by the late Prof. v. Welz, M.D., of Würzburg, has been awarded to Dr. JULIUS SAMELSOHN, of Cologne, for his paper "**On the Anatomy and Physiology of Retrobulbar Neuritis,**" published in *Graefe's Arch. f. Ophth.*, vol. xxviii., 1, p. 1.

The **Graefe medal**, founded by the Ophthalmological Society of Heidelberg, in honor of, and to be given every ten years to, the man that deserves the greatest credit in the advancement of ophthalmology, has been unanimously awarded to Prof. HERMANN VON HELMHOLTZ, in Berlin.

INDEX TO VOL. XIV.

Abadie, Corneal Staphyloma, 493
—— Esthetic Operations on the Eye, 374
—— Sympathetic Ophthalmia, 135
—— Tenotomy of Externi in Myopia, 479
—— Virulent Ophthalmia, 490
Accommodation, Paralysis of, after Diphtheria, 118
—— Sympathetic Paralysis of, 136
Actual Cautery in Corneal Affections, 28
Adams, Chancre of Upper Lid, 118
—— Changes in Macula, 141
—— Foreign Body near Macula, 145
Adler, Electrolysis in Leucomata, 492
Agnew, Cocaine, 399
Agraphy, 514
Ahlfeld, Blennorrhœa Neonatorum, 124
Albertotti, New Instruments, 111
—— Self-Registering Perimeter, 375
Albini, Nitric Acid Collyrium, 376
Albumen in Cataractous Patients, 505
Albuminuric Retinitis, Followed by Glaucoma Fulminans, 409
—— In the Puerperal State, 516
—— Unilateral, 367
Alcaptous Urine as a Symptom in Ophthalmoplegia, 516
Alexander, Tuberculosis of Iris and Ciliary Body, 343
Allport, Entropium, 385
Alt, Case of Sympathetic Neuro-Retinitis, 409
—— Cocaine, 399
—— Death after Cataract-Extraction, 506
—— Exudative Choroiditis, 502
—— Sympathetic Neuro-Retinitis, 348
Amaurosis, after Mumps, 368
—— From Albuminuric-Retinitis, 355
—— From Potassic Bromide, 414
—— From Tobacco, 143
—— In Deformity of Skull, 359
—— Simulation of, 104
—— Uræmic, 420
Amblyopia, Diagnosticated by Electricity, 143
—— From Lead, 357
—— From Tobacco in Women, 356
—— In a Tobacco-Smoking Diabetic, 357
—— Reflex, 356
Anæmia, Eye in Pernicious, 420
Anæsthetics in Ocular Surgery, 471
Anatomy, 377
Andrews, Cautery in Eye-Practice, 394
—— Jequirity, 340, 392, 491
Angellucci, Kerato-Conus and Conical Glasses, 132
—— Optic-Chiasma, 379
—— Theory of Vision, 381
Angioma, Electrolysis in, 481
—— Retro-Bulbar, 123
Animals, Color-Sense and Vision of, 116

Aniridia, Double Congenital, 405
Anomalies of the Eye, Congenital, 72, 112, 378
—— Of Refraction and Accommodation, 383
Anophthalmos, 470
Anterior Chamber, Foreign Bodies in, 360
—— Hemorrhages into, 343, 352
—— Recurrent Hemorrhage into, 419
—— Transplantation into, 470
Anthrax with Suppurating Phlegmon of Orbit, 334
Antiseptic Action of Cocaine, Sublimate, and Chlorine Water Compared, 447
Antiseptics in Ophthalmic Surgery, 111, 112, 319
Appenzeller, Heredity of Senile Cataract, 349
Arlt, Von, "Clinical Studies on Diseases of the Eye," 423
—— Congenital Microphthalmos and Anophthalmos, 470
—— Glaucoma, 345
Armaignac, Blepharostat, 471
—— Cocaine, 404
—— Congenital Fatty Tumor of Lids, 329
—— Ophthalmological Museum, 104
—— Speculum, 375
—— Spontaneous Cure of Retinal Detachment, 142
Aseptol, 473
Astigmatism after Cataract-Extraction, 132
—— Transitory Cases, 118
Atrophy, Optic, after Whooping-Cough, 420
—— Hereditary Optic, 510
Atropina and Glaucoma, 347
—— In Dacryocystitis, 483
Aub, Electro-Magnet, 511
—— Two Orbital Tumors, 387
Aubert, Blennorrhœa, 391
—— Curvature of Cornea, 380
Augier, Glioma, 508
AUGSTEIN, Disturbance of the Color-Sense in Neuritis, 435
AUGSTEIN, Color-Sense in Optic Neuritis, 381
Awsitidisky, Sublimate in Eye-Diseases, 391
—— Trachoma Cured by Erysipelas, 390
Ayers, S. C., Anæsthesia of Retina, 508
—— Cocaine, 399
—— Extirpation of Lachrymal sac, 121
Ayers, W. C., Atropina in Selecting Glasses, 111

Baas, Dizziness from Cataract-Glasses, 373
Badal, Osteoma of Orbit, 333
Baer, Visual Field, 316
Baeuerlein, 423; Cataract-Extractions, 107
Baker, Cataract Statistics, 506
Bandon, Intra-Ocular Hemorrhage after Extractions, 352
Basedow's Disease, 148
Base-Line in Girls, 200
Bass, Cocaine, 398
Baths, Effect of, on the Eye, 110
Baudry, Anæsthesia in Eye-Operations, 471
—— Chancre of Eyelids, 483
Baumgarten, Histology of Trachoma, 125
Beaudon, Magnet Useless for Extracting Small Foreign Bodies, 374
Bechterew, Physiological Experiments on Optic Nerve, 108
Becker, Connection between Nephritis and Cataract, 412
Benson, Aneurism of Retinal Vessels, 142
—— Ocular Paralysis after Diphtheritis, 367
Benvenutus, Graphæus, Treatise by, 104
Berberine, 491
Berger, Cortical Visual-Sphere, 476
Bergmeister, Congenital Dermoid, Double, 337
—— School for the Blind, 106

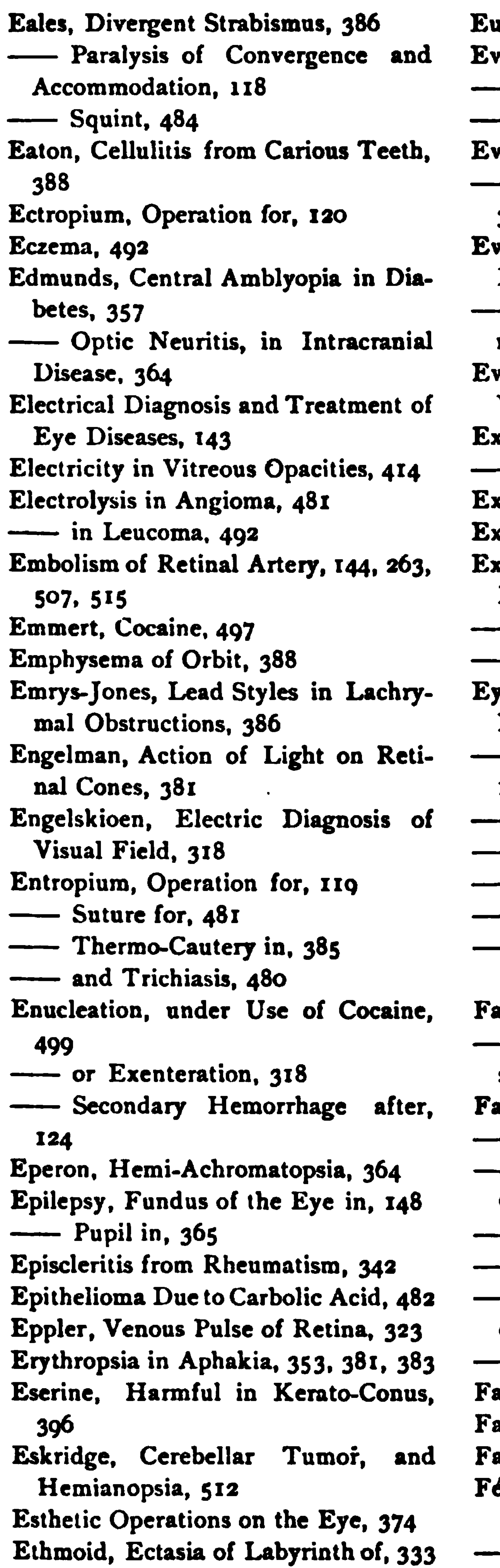
Berlin, Perception of Depth and Distance, 114
Bernard, Mental Blindness, 143
Berry, Latent Squint in Metre-Angles. 330
—— Temporal Hemianopsia, 355
—— Tobacco Amblyopia in Women, 356
Berthold, Enucleation without Narcosis in a Pregnant Woman, 371
—— Physiology of Cocaine, 496
BESELIN, Refraction, Base-Line, and Dynamics of the Lateral Muscles in Girls, 200
Betmann, Pulsating Exophthalmus, 335
Beumer and Peiper, Credé's Prophylaxis, 337
Bierwith, Ophthalmoscopic Pictures in Pernicious Anæmia, 420
Binocular Vision, 114
Birnbacher, Dislocation of Lens, 505
—— Incandescent Lamp, 319
—— Metastatic Carcinoma of Choroid, 502
—— Pigmentation of Melanotic Sarcoma, 134
Bjelow, Dynamic Equilibrium of the Lateral Muscles, 386
Blennorrhœa Neonatorum, 125, 337, 488
Blepharoplasty, 120, 385
Blepharospasm Due to Astigmatism, 330
Blepharostat, 472
Blind in Russia, 314, 373
"Blindness," Text-Book on, 468
—— In General Paralysis, 365
—— With Hemi-Chorea, 514
Bobone, Cocaine, 404
Boggi, Jequirity. 392
Bono, Blepharoplasty without a Pedicle, 385
—— Thebaine in Ophthalmology, 376
Bos, Syphilitic Cataract, 505
Boucher, Anthrax, Suppurating Phlegmon of Orbit, 334
—— Do Vegetable Foreign Bodies Injure the Cornea? 396
Bouchut, Ophthalmoscopic Appearances in Meningitis, 363
Boursier, Injury of Eye from Molten Lead, 360
Bouvin, Neuro-Retinitis from Cerebral Disease, 359
Bowman, Recovery from Sympathetic Ophthalmia, 137
Brailey, Headaches Cured by Prisms, 331
—— Tubercle of the Eye, 134
Brauere, Electricity in Vitreous Opacities, 414
Bravais, Simulation of Amaurosis, 104
Brincken, Retro-Bulbar Cavernoma, 123
—— Chancre of Lid, 329
Brockmann, Four Cases of Sympathetic Ophthalmia, 347
—— Review of 1,767 Cataract-Extractions, 314, 350
Browne, Tri-Chloride of Phenol, 490
Bruch, Trichiasis, 330
Brunet, Unilateral Albuminuric Retinitis, 367
Brunschwig, Jequirity, Experiments with, 339
Bruylant, Jequirity, 127
Bucklin, A New Polariscope, 375
Bull, Cocaine, 399
—— Sense of Light, 380
—— Transplantation, 483
—— Trituration of Cortex, 349
Buller, Mucocele of Frontal Sinus 5
Bunge, Halle Ophthalmic Clinique, 467
—— Visual Field, 113
Burchardt, Chalazion, 329
—— Eczema, 492
Burnett, C. H., Neuritis, 147
BURNETT, S. M., Abscess of Orbit, Blindness, Optic Atrophy after Attempted Tooth-Extraction, 177
—— Atrophy of Optic Nerve, 509
—— Color Perception, 326
—— Ophthalmometry with the Ophthalmometer of Javal and Schiötz, 169
—— Separate Centres of Perception, 380

Calderone, Commotion of the Retina, 414
Calhoun, Enucleation under Cocaine, 499
Callan, Optic Atrophy after Whooping-Cough, 420
Calomel, Hypodermatic Use of, 112
Campart, Rheumatic Episcleritis, 342
—— Cavernous Angioma of Orbit, 487
Cant, Atropina and Glaucoma, 347
Capsule, Primary Rupture of, 350
Capsulotomy in Extraction, 413
Careras-Arago, Cocaine, Therapeutics of, 499
Caro, Pilocarpine in Eye-Diseases, 406, 343
Carter, Cataract, 109
Cartilage, Glands of Tarsal, 475
Caspodi, Jequirity Ophthalmia, Non-Bacillic, 128
—— Massage in Ophthalmology, 397
Cat, Eyes of the, 378
Cataract, Artificial Maturation of, 506
—— Connection between, and Nephritis, 412
—— Fluid Hypermature, 412
—— Heredity of, 349
—— Incipient, with Spontaneous Pulsation of Retinal Blood-Vessels, 142
—— Morgagnian, 258
—— Syringe for Maturing, 351
—— Trituration of, 139, 349
Cataract-Extraction, 1, Followed by Death, 506
—— Followed by Hemorrhage, 139
—— Influenced by Health of Patients, 149
—— Intra-Ocular Hemorrhage after, 352
—— 100 Cases of, 138
—— 35 Cases of, 139
—— 63 Cases of, 139
—— 63 Cases of, 1
—— 423 Cases of, 107
—— 122 Cases of, 108
—— Statistics of, 371, 411
—— Thermometry in, 351
—— With One Instrument, 412
Cataract-Glasses, Dizziness from, 373
Cathartic, a Powerful, Followed by Optic-Neuritis, 417
Caudron, Hydatid Cyst of Orbit, 123
Cerebral Affections wtth Ocular Symptoms, 143
Chalazion, 329
Chancre of Lids, 483
Charpentier, Differential Perception of Colors, 382
—— Photometer, 320
—— Hemeralopia in Hypertrophy of the Liver, 368
—— Visual Functions, 322
Chauvel, Ivory Exostosis of Frontal Sinus, 388
Chauzeix, Jequirity in Corneal Diseases, 128
CHEATHAM, Cataract-Extractions, 1
Chiasma, Anatomy of the, 379
Chibret, Congenital Hemeralopia, 140
—— Sublimate, 473
—— Technique of Cataract-Extraction, 350
Chisholm, Iron in Vitreous Removed with Magnet, 414
Chlorine Water, Antiseptic Action of, 447
Chloroform-Narcosis, Effect of, on the Eye, 110
Chorea, Ocular Muscles in, 122
Chorio-Retinitis, Mercurials in, 345
Choroid, Affections of, 406
—— Colloid Excrescences of the, 134
—— Metastatic Sarcoma of, 185, 345, 407, 502
—— Pathological Anatomy of, 60
—— Tubercle of, 134, 148, 344, 408
Choroiditis Exudativa, 502
Chromatokinopsias, Studies on, 81
Cicardi, Lymphatic Opacity of Cornea, 493
Ciliary Body, Tuberculosis of, 133
Clark, Divergent Squint, 484
Clinical and Statistical Reports, 105, 107, 314, 371
Clizbe, Foreign Body in Eye Twenty-Three Years, 418

Cocaine Anæsthesia, Measurement of, 243
Cocaine, Antiseptic Action of, 447
—— Bad Effects Following, 500
—— Forty-one Experiences with, 398, 494
Cocci, Trachoma Cured by Erysipelas, 393
Cohn, Cocaine, 500
—— Pupil-Dilating Fibres, 322
Coggin, Atropina Glaucoma, 503
Coloboma of Macula Lutea, 112
—— Of Optic-Nerve Sheath, 113, 359
Color, Aural Sensations of, 383
—— Differential Perception of, 382
Color-Blind, Spectra of the, 382
Color-Blindness, 116
—— Lantern for Testing, 383
—— Results of Tests for, 383
—— Traumatic, 327
Color Perception in Syphilitics, 422
Color-Sense, Disturbance of, in Neuritis, 435
Conjunctiva, Affections of, 389
—— Angioma of, 130
—— Cysts of the, 340
—— Dermoid of the, 393
—— Horse-Pox of the, 340
—— Melano-Sarcoma of, 340, 492
—— Papillomata of, 393
—— Tuberculosis of, 491
—— Vesicles of, 100
—— Xerosis of, 131, 338, 394
Conjunctivitis, Diphtheritic, 125
—— New Form of, 338
—— Of Miners, 146
Connen, Blennorrhœa Neonatorum, 125
Conti, Basedow's Disease, 148
—— Color Perception in Syphilitics, 422
Conus, Cases of Congenital, 510
Convergence, Amplitude of, 484
—— Paralysis of, 118
Copper, Citro-Ammoniac of, 473
Coppez, Discussion on Jequirity, 129
Corelysis, Opposed, 343
Cornea, Affections of, 389
—— Cancer of, 493
Cornea, Circulation of the, 396
—— Combustion of, 341
—— Curvature of, 115, 380
—— Fibroma of, 397
—— Herpes of, 493
—— Lepra of, 494
—— Linear Cauterization in Ulcers of, 341
—— Lymphatic Infiltration of the, 132, 493
—— Lymphatic Opacity of, 493
—— Necrosis of, after Use of Leaden Style, 386
—— Primary Necrosis of, 341
—— Scraping in Ulcers of, 131
—— Conjunctival Flap in Ulcers of 131
—— Staphyloma of, 493
—— Syphilitic Affections of, 395
—— Tuberculosis of, 493
—— Ulcers of, Cured by Means of Conjunctival Flap, 341
Couper, A Magazine Ophthalmoscope with 72 Glasses, 320
Cowell, Credé's Method, 490
Crawford, Cocaine, 399
Credé, Blennorrhœa Neonatorum, 337, 391, 490
Critchett, Chronic Membranous Conjunctivitis, 124
—— Sarcoma of Orbit in a Child, 123
Cuignet, Anterior and Posterior Glaucoma, 408
—— Hemorrhage into Anterior Chamber, 343
Culbertson, Iriscystotome, 376
Cutter, Myopia in the Japanese, 480
Cyclitis, Investigations into, 407
—— Plastic Exudative, 407
Cyclope, 377
Cystoid Cicatrix, Operation for, 133
—— Followed by Panophthalmitis, 135
Cysticercus, Subconjunctival, 147, 419
—— Subretinal, 147
Czermak, Zonula, 474

Dacryoadenitis, 483
Dacryocystitis, Atropina in, 483

Dacryocystitis, bacteria of, 395
—— From Jequirity, 330
Daguillon, Pellucid Staphyloma of Cornea, 492
Danesi, Scleritis, 494
Dariez, Electrical Diagnosis of Amblyopia, 143
Darrier, Virulent Ophthalmia, 488
Deaf-Mutes, Eyes of, 104
Debenedetti, Centre of Ocular Movement, 476
Dehenne, Galvano-Cautery in Trachoma, 338
—— Influence of Health on Cataract-Operations, 149
—— Hydrophthalmus, 346
—— Wounds of the Eye, 511
Dejerine, Paralysis of Levator Palpebrarum, 387
Del Toro, Dacryocystitis from Jequirity, 330
Deneffe, Jequirity and Jequiritine, 339
Denissenko, Albuminuric Ophthalmia, 362
—— Photopsies of the Retina, 477
Denk, Xerosis of the Conjunctiva, 341
Denti, Cocaine, 404
—— Retinitis Pigmentosa, 142
Depth and Distance, Perception of, 114
Derby, H., Gangrene of Eyelid, 482
—— Iridectomy in Chronic Iritis, 501
—— Refraction during College Life, 118
Derby, R. H., Contagious Ophthalmia, 391
Despagnet, Fibroma of Optic Nerve, 417
Deutschmann, Pathogeny of Sympathetic Ophthalmia, 410
Diabetic Cataract, 506
Dianoux, Visual Troubles in Goitre, 388
Dickey, Dislocation of Lens, 505
——Glioma of Retina, 416
Dieu, Cyst of Orbit, 123
DIMMER, Pathological Anatomy of Choroid, 60
—— Congenital Anomalies of the Eye, 72
DIMMER, Eye Diseases after Recurrent Fever, 150
Diphtheritic Conjunctivitis, 125
—— Paralysis, 486
Diphtheritis, Followed by Optic Neuritis, 367
—— by Ophthalmoplegia Totalis, 367
—— by Paralysis, 367
Dircknik, Jequirity Ophthalmia not Bacterial, 127
Divergent Squint, 484
Dobrowolsky, Convergence as a Cause of Myopia, 479
—— Color Perception in Different Parts of Retina, 326
Dohnberg, Entropium Operation, 119
Dolschenko, Cancer of Cornea, 493
—— Rare Cases of Sympathetic Ophthalmia, 135
Donders, Color Theories, 327
Dor, Ocular Derangements during Menstruation, 148
—— Operation for Trichiasis, 120
Dorn, Clinique, 314
Dornig, Gumma of the Eyelids, 118
Dubois, Chloroform Narcosis, Effect of, on the Eye, 110, 373
Dubrueil, Cataract-Extraction, 348
Dujardin, Bilateral Isolated Ptosis, 387
—— Electro-Magnet Extraction, 511
—— Exenteration, 470
—— Galvano-Cautery, 111
—— Glioma of Retina, 508
—— Hydrophthalmus, 501
—— Injuries of Eye, 360
—— Luxation of Lens into the Vitreous, 138
—— Malignant Pustule of Lids, 329
—— Ophthalmoscopy of Infants, 370
—— Sublimate in Trachoma, 126
Duval and Real, Pecten of Birds, 474
Van Duyse, Coloboma of Macula, 112
—— Coloboma of Optic-Nerve Sheath, 113
—— Conus Downward, 113
—— Double Congenital Aniridia, 405
—— Panophthalmitis Six Months after Extraction, 352



Eales, Divergent Strabismus, 386
—— Paralysis of Convergence and Accommodation, 118
—— Squint, 484
Eaton, Cellulitis from Carious Teeth, 388
Ectropium, Operation for, 120
Eczema, 492
Edmunds, Central Amblyopia in Diabetes, 357
—— Optic Neuritis, in Intracranial Disease, 364
Electrical Diagnosis and Treatment of Eye Diseases, 143
Electricity in Vitreous Opacities, 414
Electrolysis in Angioma, 481
—— in Leucoma, 492
Embolism of Retinal Artery, 144, 263, 507, 515
Emmert, Cocaine, 497
Emphysema of Orbit, 388
Emrys-Jones, Lead Styles in Lachrymal Obstructions, 386
Engelman, Action of Light on Retinal Cones, 381
Engelskioen, Electric Diagnosis of Visual Field, 318
Entropium, Operation for, 119
—— Suture for, 481
—— Thermo-Cautery in, 385
—— and Trichiasis, 480
Enucleation, under Use of Cocaine, 499
—— or Exenteration, 318
—— Secondary Hemorrhage after, 124
Eperon, Hemi-Achromatopsia, 364
Epilepsy, Fundus of the Eye in, 148
—— Pupil in, 365
Episcleritis from Rheumatism, 342
Epithelioma Due to Carbolic Acid, 482
Eppler, Venous Pulse of Retina, 323
Erythropsia in Aphakia, 353, 381, 383
Eserine, Harmful in Kerato-Conus, 396
Eskridge, Cerebellar Tumor, and Hemianopsia, 512
Esthetic Operations on the Eye, 374
Ethmoid, Ectasia of Labyrinth of, 333
Eustache, Fœtus-Cyclope, 377
Eversbusch, Anatomy of Iris, 378
—— Cocaine, 496
—— Nystagmus, 122
Evisceration of Eyeball, 167
—— Followed by Orbital Cellulitis, 309
Ewetzky, Anomalous Venous Pulse of Retina, 323, 354
—— Ectasia of Labyrinth of Ethmoid Bone, 333
Ewsejenko, Jequirity of Doubtful Value, 128
Exenteration or Enucleation, 318, 374
—— Under Cocaine, 499
Exner, Cortex of Brain, 476
Exophthalmic Goitre, 124, 389
Exophthalmus in Cardiac, Renal, and Hepatic Disorders, 190
—— Periodic, 123
—— Traumatic, 389
Eye, Affections of, in Constitutional Diseases, 362, 512
—— Affections of, in Bright's Disease, 149
—— Heredity of Color of the, 371
—— Injuries of the, 145, 511
—— Nævus of, 142
—— Tubercle of the, 134
—— Vision of the, in Indigestion, 422

Falchi, Fibroma of Cornea, 397, 492
—— New Formation of Anterior Capsule, 316
Fano, Cocaine, 400
—— Jequirity, 129
—— Iridectomy in Posterior Polar Cataract, 344
—— Retinal Detachment, 142
—— Rupture of Sclera, 418
—— Spontaneous Elimination of Foreign Body from the Eye, 145
—— Sympathetic Ophthalmia, 503
Fat in Upper Eyelids, 482
Faucher, Blepharostat, 320
Favus of Eyelid, 482
Féré, Cerebral Localization of Visual Disturbances, 513
—— Ophthalmic Megrim, 369

Ferguson, Spasmodic Internal Strabismus, 331
Ferret, Parenchymatous Keratitis, 395
Ferri, Instrument for Muscular Insufficiency, 122
—— Perimeter, 472
Ferrier, Rheumatic Ophthalmia, 149
—— Injury of Eye from Molten Lead, 360
Fibroma of Cornea, 397
Ficano, Dermoid of Conjunctiva, 393
—— Jequirity, 393
Fieuzal, Cocaine Injections, 497
—— Credé's Method, 490
—— Hemorrhagic Cataract, 139
Fisch, Linear Cauterization in Corneal Ulcers, 341
Fiske, Exenteration, 471
Fitzgerald, Errors in Determining Refraction, 384
—— Sexual Eye Diseases in Women, 368
Fodor, Cocaine in Exenteration, 499
Foerster, Charts for Visual Field, 109
—— Concave Glasses, 388
—— Method of Maturing Cataracts, Results of 349, 351, 374
Fontan, Diagnosis of Hemeralopia, 141
—— Orbital Emphysema, 388
Foreign Body, near Macula, 145
—— Spontaneous Elimination of, from the Eye, 145
—— Removal of, with Electro-Magnet, 511
—— Twenty-Three Years in the Eye, 418
Formiggini, Lead-Amblyopia, 357
Fortunati, Cure of Retinal Detachment, 355
Fox, Acute Unilateral Neuritis, 417
—— Cystic Tumors of the Orbit, 333
—— Hydrobromic Acid in Quinine Amblyopia, 417
—— Sympathetic Ophthalmia, 504
Fraenkel, Papillitis in Sympathetic Ophthalmia, 136
Frank, Cocaine, 498
—— Exophthalmic Goitre, 389
Franke, Foreign Bodies in Anterior Chamber and Iris, 360
—— Injury of the Eye with a Steel Pen, 146
—— Persistent Pupillary Membrane, 500
Friedenwalde, Uræmic Amaurosis, 420
Frontal Sinus, Mucocele of, 335
Frost, Recovery in Sympathizing Eye in Sympathetic Ophthalmia, 137
Frothingham, Corneal Staphyloma, 493
—— Skin Transplantation, 483
—— Traumatic Dislocation of Lens, 411
Fryer, Double Congenital Ectopia Lentis, 348
Fuchs, Atrophy of Optic Nerve, 509
—— Blindnesss, 468
—— Inflammatory Glaucoma, 408
—— Muscular Asthenopia, 485
—— Sympathetic Paralysis of Accommodation, 136
—— Syphilitic Iritis, 405
FULTON, Primary Inflammation of Lachrymal Gland, 161
—— Orbital Cellulitis after Passing a Lachrymal Probe, 164
—— Retinal Hemorrhage, 507

Galezowsky, Herpes of Cornea, 493
—— Jequirity Useless, 128
—— Retinal Detachment, 142
—— Sex in Cocaine, 404
Gallenga, Artificial Maturation of Cataract, 506
—— Melanotic Sarcoma of Lid, 385
—— Migration of Tissue, 501
Galup, Potassic Iodide in Graves' Disease, 389
Galvano-Cautery in Eye-Diseases, 31, 111
—— Second Series of One Hundred Cases of Eye-Diseases Treated with, 455
Gama-Pinto, Hemorrhage after Cataract-Extractions, 139
Gangrene of Eyelids, 482

Gard, Electrolysis in Chalazion, 480
Garrigues, Results of Credé's Method, 391
Gayet, Atrophy of Globe, 470
—— Iridectomy with Empty Anterior Chamber, 109
—— Tuberculosis of Conjunctiva. 491
—— Ultra-Violet Vision, 139
Gazépy, Portable Perimeter, 320
Gelpi y Jafre, External Affections of the Eye, 468
Gelphe, Pemphigus of Conjunctiva, 491
Gielen, Blennorrhœa Neonatorum, 125
Gillet de Grandmont, Campimetry, 472
Girard, Choroiditis at the Maculæ, 344
—— Modified Hotz' Operation, 385
Glaucoma, 408
—— after Dislocated Lens, 409
—— Anatomy of, 409
—— Anterior and Posterior, 408
—— Caused by Atropina, 347, 503
—— by Homatropina, 42, 347
—— Following Tenotomy, 347
—— Fulminans in Albuminuric Retinitis, 409
—— Hæmorrhagicum, 135
—— Inflammatorium, 408
—— Medical Treatment of, 347
—— Stretching of Infratrochlear Nerve in, 503
—— Paracentesis of Sclera in, 503
—— Sclero-Iridectomy in, 503
—— Sympathetic, 408
—— Theories, Treatment, etc., 345
Glioma of Retina, 416, 508
Goldzieher, Anomaly at Yellow Spot, 474
—— Streptothrix in Lower Canaliculus, 120
Gonococcus in Blennorrhœa, 490
Gonzales, Granulations of Conjunctiva, 125
Gossetti Favors Jequirity, 393
Gotti, Intravascular Hemorrhage after Extraction, 352
—— Jequirity, 393
Gout, the Eye in, 420
Gowers, Eye and Spinal Diseases, 366
—— Ocular Muscles in Chorea, 122
Graber, Vision of Animals, 116
Gradenigo, Electrical Spectacle-Frames, 376
Graefe, Enucleation or Exenteration, 318
Grahamer, Congenital Hydrophthalmus, 374, 406
Grandmont, Electricity in Ophthalmology, 143
Grandclement, Traumatic Dislocation of Lens, 349
Graselli, Cocaine, 400
Graves' Disease, Potassic Iodide and Hydrotherapeutics in, 334, 389
Green, Cocaine, 399
Grigorieff, Etiology of Trachoma, 125
Gros, Exophthalmic Goitre, 124
Gruel, Hydrotherapeutics in Graves' Disease, 389
Gruenhagen, Pupil-Dilating Fibres, 322
GRUENING, Actual Cautery in Ulcus Corneæ Serpens, 28
—— Blepharoplasty, 120
Guaita, Anatomy of Retinitis Pigmentosa, 415
—— Retinitis Pigmentosa, 354
Guelliot, Nicotine Amaurosis, 143
Gumma of Sclera, 397
Gunn, Peculiar Appearances in Retina, 141

Haab, Blennorrhœa Neonatorum, 488
——Tuberculosis of the Eye, 373, 406
Haensell, Anatomy of Vitreous Body, 378, 474, 506
—— Investigations into Cyclitis, 407
Haering, 24,899 Patients, 469
Hallapeau, Blindness with Hemi-Chorea, 514
Haltenhoff, Gonorrhoic Conjunctivitis, 335
—— Notice of Daviel, 370
Hansell, Fundus of the Eye in Epilepsy, 148

Hardy, Alkaloid of Jequirity, 339
Harlan, Fixation for Visual Field, 111
—— Swelling of Optic Papilla, 510
Hartridge, Cocaine, 399
Hasner, von, Operation for Persistent Pupillary Membrane, 133
Hay, Hyperbolic Glasses, 480
Hay-Fever, Eye in, 368
Headache and Refractive Errors, 515
Hedinger, Graves' Disease, 334
Heisrath, Corneal Opacities, 131
—— Jequirity, 336
Hemeralopia in Hypertrophy of the Liver, 368
Hemi-Achromatopsia, 355, 364
Hemianopsia, 143
—— in Cerebellar Tumor, 512
—— Temporalis, 355
—— Traumatic with Polyuria, 422
Hemorrhage, into Anterior Chamber after Extraction, 352
—— Intra-Ocular after Extractions, 352
—— Recurrent into Anterior Chamber, 419
Hennius, Binocular Blindness in Puerperal State, 515
Hereditary Optic Atrophy, 510
Hersing, Refraction in School-Children, 383
Heyne, Changes in Tissue of Iris in Disease, 316
Hilbert, Associated Sensations of Taste and Smell with Vision, 116
—— Color-Blindness, 116
—— Erythropsia, 383
—— Eyes of the Cat, 378
—— Gangrene of Eyelids in Children, 329
Hill, Orbital Cellulitis, 122
Hindoos, Eyes of the, 371
Hippell, von, Iodoform, 111
Hirschberg, Amaurosis Due to Albuminuric Retinitis, 355
—— Cocaine, 398, 402
—— "Der Electro-Magnet in der Augenheilkunde," 426
—— Double Rheumatic Embolism, 515
Hirschberg, Electro-Magnet, 471
—— Embolism of Retinal Artery, 144
—— Metastatic Carcinoma of Choroid, 502
—— Metastatic Irido-Choroiditis, 515
—— Metastatic Sarcoma of Choroid, 407
—— Retrobulbar Neuritis, 358
—— Symblepharon Operation, 130
—— Traumatic Division of Optic Nerve, 361,
Hirschberg and Birnbacher, Papillomata of the Conjunctiva, 340
Hochegger, Development of the Color-Sense, 381
Hock, Ophthalmoplegia Totalis, 331
—— Peripheral Retrobulbar Neuritis, 358
—— Tenonitis, 332
HODGES, Glaucoma Caused by Homatropina, 42
Hoeltzke, Cocaine, 402
Hoffmann, Embolism of Central Retinal Artery, 507
—— Muscles and Refraction, 328
Hofmann, Miners' Conjunctivitis, 146
HOLMES, Evisceration of the Globe, 167
Holmgren, Spectra of the Color-Blind, 382
Homatropina a Cause of Glaucoma, 42, 347
Horrocks, Facial and Ocular Nævus, 142
Horstmann, Cocaine, 398
—— Refraction during First Five Years of Life, 45, 383
Hospital, Ophthalmic, at Halle, 467
Hotz, Hemorrhage at Macula, 416
—— Modified Operation of, 385
HOWE, Cocaine, 401
—— Measurement of Cocaine-Anæsthesia, 243
Hunicke, Syphilitic Periostitis of Orbit, 388
—— Cocaine, 399
Hutchinson, The Eye and Gout, 420
Hyaline Degeneration, 151

Hydrastine, 491
Hydrophthalmus, 346, 374
—— Congenital, 406
—— Operation for, 374
Hydrobromic Acid in Quinine Amaurosis, 417
Hydrotherapeutics in Graves' Disease, 389
Hyperbolic Glasses, 480
Hypermetropia from Myopia, 479

Ice, Effect of, on the Eye, 110
Indigestion and Vision, 422
Inouye, Clinique in Japan, 315, 371
Injuries of Eye, 360, 417
Instruments, 111, 319, 351, 375
Insufficiency, Instrument for Measuring, 122
—— Partial Tenotomy in, 330
Intermittent Catarrhal Ophthalmia, 490
Iridectomy, a Preparatory, 318
—— Injurious in Posterior Polar Cataract, 344
Irido-Choroiditis, Anatomical Description of, 342
—— Metastatica, 515
—— Serosa, 407
Irido-Sclerotomy, 396
Iris, Affections of, 405
—— Anatomy of Finer Structures of, 378
—— Cystome, 376
—— Foreign Bodies in, 360
—— Innervation of Nerves of, 324
—— Medico-Legal Aspect of Injuries of, 362
—— Movements of, 478
—— Pearly Cyst of, 405
—— Suppurating Gumma of, 405
—— Tissue-Changes in Eye-Diseases, 316
—— Tuberculosis of, 133, 343
Iritis, Iridectomy in Chronic, 501
—— Syphilitica, 405
Issigonis, Gun-Cap, Extraction of, from the Vitreous, 146
Iwanoff, Clinique, 372
—— Sublimate in Eye-Diseases, 392

Jacobson, Glaucoma, 346, 502
—— Jequirity, 338
—— Preparatory Iridectomy, 318
Jackson (Hughlings), Associated Eye and Ear Diseases, 363
—— Fracture of Frontal Bone, 123
Jalon, Amaurosis after Mumps, 368
Jan Hoene, Exophthalmus Due to a Gumma, 332
Jan, Nicotinic Paralysis, 486
Jany, Clinique, 372
Japan, Eye Diseases in, 315, 480
Jeffries, Education of the Normal Color-Sense, 382
Jegorow, Cataract-Extractions, 351
Jequirity, Constitutionnl Effects of, 128
—— Contra-Indications for, 129
—— Dangers from, 491
—— Dangerous in certain cases, 127, 129
—— Discussion concerning, 129
—— Followed by Dacryo-Cystitis, 330
—— Its Action Doubtful, 128
—— Its Action due to Microbes, 128
—— Nature of the Ophthalmia of, 127
—— Notices concerning, 338
—— Ophthalmia, not Bacterial, 127
—— Toxic action of, 128
—— Useful in ulcerative keratitis, 128
—— Useless in eye-diseases, 128.
—— Various experiences with, 329
JOHNSON and PRUDDEN, Myxo-Sarcoma of Optic Nerve, 151
Joly, Word-Blindness, 148
Jones, Malarial Retinal Hemorrhages, 515
Joye, Atropina in Dacryo-Cystitis, 483
—— Wounds of Sclera with a Conjunctival Flap, 397
Juler, Sarcoma of Orbit in a Child, 123
Just, Clinique, 315
—— Cocaine, 499

Karyokinesis, 316, 317
Kazaurow, Cataract-Extraction with One Instrument, 412
—— Cocaine, 403

Kazaurow, Effect of Hot-Baths on the Eye, 110
—— Erythropsia in Aphakia, 353
—— Intra-Ocular Hemorrhage after Extraction, 352
—— Nuclear Ophthalmoplegia, 486
—— One Hundred Cataract-Extractions, 138
—— Sympathetic Glaucoma, 408
Keratitis, Central, 109
—— Neuro-Paralytic, 132
—— Parenchymatous, 395
—— Punctata, 395
Kerato-Conus, 169
—— Glasses in, 132
—— Measurements of, 132
—— Hyperbolic Glasses in, 480
—— Not Improved by Eserine, 396
Kerner, Cocaine, 398
KEYSER, Recoveries from Sympathetic Ophthalmia, 12
—— Panophthalmitis after Cocaine, 500
——Sarcoma of Lachrymal Gland, 386
Kiebersztowicz, Combustion of Cornea, 341
Kipp, Disease of Frontal Sinus, 487
—— Nine Cases of Injury to the Eye, 418
—— Purulent Conjunctivitis, 491
—— Serous Irido-Choroiditis and Blindness, 407
Klein, Jequirity Ophthalmia not Due to Microbes, 127
KNAPP, Cocaine, 403
—— Eighth Hundred of Cataract-Extractions, 138
—— Electro-Magnet in Ophthalmic Surgery, 302
—— Evisceration Followed by Orbital Cellulitis, 309
—— Neuroretinitis, 510
Kœnig, Color-Blindness Apparatus, 375
—— Di-Chromatic Color-Systems, 325
Kœnigstein, Cocaine, 401, 499
—— Credé's Method, 337
Kolipinski, Potassic-Chlorate in Conjunctivitis, 391
Koller, Cocaine, 400
Kollock, Indications for Jequirity, 129
Kotelmann, Singhalese and Hindoo Eyes, 371
Kowalewsky, Innervation of Pupil, 477
Kruekow, Needle Removed with Magnet, 419
Kuhnt, Conjunctival Flap for Corneal Ulcers, 131
—— Corneal Ulcers with Conjunctival Flap, 341
Kuschbert, Xerosis of the Conjunctiva, 341

Labat, Horse-Pox on the Conjunctiva of a Colt, 340
Lachrymal Apparatus, 386
Lachrymal Glands, Removal of, 121
—— Primary Inflammation of, 151
—— Sarcoma of, 386
Lachrymal Obstructions, Styles in, 386
Lachrymal Sac, Fungi of, 121
Lagrange, Melano-Sarcoma of the Conjunctiva, 340
—— Stretching of Nasal Nerve, 330
Lainey, Capsular Advancement, 484
LAKER, Injury to Eye from a Lightning Stroke, 181, 356
Lamina Cribrosa, 475
Lamonerie, Ocular Syphilis, 148
Landesberg, Albuminous Urine in Cataract Cases, 505
—— Fulminant Glaucoma in Albuminuric Retinitis, 409
—— Jequirity, 340
—— Neuritis, 358
—— Sympathetic Ophthalmia, 411
—— Transitory Astigmatism, 118
—— Sensation of Light, 114
—— Ulcers of Cornea, 394
Landolt, Amplitude of Convergence, 484
—— Blepharostat, 472
—— Cocaine, 404
—— Myopia, 117
Lange, Antiseptics, 376
—— Fluid Hypermature Cataract, 412
Langl, Intra-Ocular Sarcoma, 407

Lapersonne, Traumatic Alterations in the Retinal Pigment, 146
Laquer, Curvature of Cornea, 115
Lateral Muscles, Dynamics of the, in Girls, 200
Laure, Word-Blindness, 514
Lawford, Optic Neuritis in Intra-Cranial Disease, 364
Lawson, Tumor of the Orbit, 123
Layet, Sight and Penmanship, 118
Lead, Amblyopia from, 357
—— Injury of Eye from Molten, 360
Leaden Style, and Corneal Necrosis, 386
Leber, Foreign Bodies in the Eye, 361
Ledda, Malarial Optic Neuritis, 516
Lediard, Exostosis of Orbit, 123
Lens, Cataract-Extraction, Immature Cataract, etc., 348, 411
—— Chemical Composition of, 374
—— Dislocation of, 505
—— Extraction, Dislocation, etc., 411
—— into the Vitreous, 412
—— Glaucoma after Dislocation of, 409
—— Luxation into Vitreous, 138
—— Spontaneous Absorption of, 138
—— Traumatic Dislocation of, 349
Leopold and Wessel, Blennorrhœa Neonatorum, 337
Leplat, Electrolysis in Angioma, 481
—— Parenchymatous Keratitis, 395
Lepra of Eye, 420
Leroy, Keratoscopy, 118
Leucomata, Electrolysis in, 492
Leucoscope, 376
Levator Palpebrarum, Paralysis of, 387
Librecht, Color-Blindness, 383
Lids, Affections of, 328, 384
—— Carcinoma of, 19
—— Chancre of, 329
—— Congenital Fatty Tumors of, 329
—— Gangrene of, 329
—— Malignant Pustule of, 329
—— Melano-Sarcoma of, 385
Lightning Stroke, Injury to Eye from, 181, 356
Lippincott, Orbital Abscess, 488
—— Glioma of Retina, 508
Little, Cocaine in Diphtheritic Conjunctivitis, 499
—— Ocular Symptoms in Bright's Disease, 149
—— Pupillary Symptoms in Various Diseases, 422
Liver, Affection of, after a Blow on the Eye, 516
—— Hemeralopia in Hypertrophy of, 368
Lloyd, Traumatic Exophthalmus, 389
Loeb, Visual Spheres, 323
Lopez, Atheroma of Orbit, 487
Lubrecht, Lead-Intoxication with Amaurosis, 357
Luchsinger, Innervation of Nerves of Iris, 324
—— Jequirity, 392
Lundy, Oleate of Cocaine, 495
Lussana, Aural Sensations of Color, 383
Lutz, Ocular Affections during Pregnancy, 368
Lyons, Cocaine Hydrobromate, 498

MacHardy, Ectropium, 481
—— Favus of Eyelid, 482
—— Fat in Upper Eyelids, 482
Mackenzie, Tubercle of Choroid and Brain, 148, 344
Macula, Choroiditis at the, 344
—— Coloboma of, 507
—— Fibres in the, 113
—— Hemorrhage at, 416
Maddox, Instrument for Convergence and Accommodation, 331
Magawley, Antisepsis in Ophthalmology, 374
—— Lepra of Cornea, 494
Magnet, Foreign Bodies Removed by Means of, 196
—— In Ophthalmic Surgery, 302, 422
—— Removal of Needle with, 419
—— Removal of Foreign Bodies with, 414
—— Steel Removed by Means of, 353
—— Useless for Small Foreign Bodies, 374

Magni, New Form of Conjunctivitis, 338
—— Cocaine, 404
Magnus, Anomaly at Yellow Spot, 474
—— Congenital Anomalies of the Optic Nerve, 113
—— Periodic Exophthalmus, 123
Maier, Clinique, 315
Maklakoff, Cataract-Extraction, 350
—— Method of Fixing the Eye during Operations, 321
—— Ophthalmotonometer, 472
—— Strabismus Operation, 121
Makrocki, Anomalies of the Iris, 342
Malaria, Eye-Diseases in, 515
Malformations of Optic Nerve, 144
Manhavielle, Thermo-Cautery in Lachrymal Diseases, 483
Manfredi, Glaucoma in Ectopia Lentis, 409
—— Jequirity Ophthalmia not Due to Microbes, 128
—— Sub-Conjunctival Cysticercus, 419
Manz, Cysticercus Cellulosæ, 147
Maren, Tubercle of the Eye, 148
Martin, Blepharospasm Due to Astigmatism, 330
—— Care of Instruments Used on the Eye, 351
Masini, Stretching of Naso-Ciliary Nerve, 121
Massachusetts Eye and Ear Infirmary, Report of 8,097 Cases, 469
Massage in Eye-Diseases, 342
Masse, Transplantation into Anterior Chamber, 470
Masselon, Colloid Excrescences of the Choroid, 134
—— Lamina Cribrosa, 475
Massey, Sudden Loss of Vision, 509
Masson, Corneal Astigmatism after Cataract-Extraction, 132
Matthiesen, Astigmatic Pencils of Light, 322
Mauthner, Complicated Muscular Paralysis, 331
—— Paralysis of Oculo-Motor Nerve, 486
—— Red Reflex from Fundus, 313
Mayer, Studies on the Pupil, 113
MAYERHAUSEN, Self-Registering Perimeter, 54
—— Studies on Chromatokinopsias, 81
—— Cocaine, 500
McFarland, Experience with Prisms, 111
McKeown, Credé's Method, 490
—— Syringe in Immature Cataract, 351
Medico-Legal References, 362
Melano-Sarcoma of Lid, 385
—— Pigmentation of, 134
Mendel, Diphtheritic Paralysis, 486
Meningitis, Ophthalmoscopic Appearances in, 363
Menstruation, Eye Diseases from Irregular, 148
—— Retinal Hemorrhage from Suppressed, 416
Merck, Cocaine, 398
Meyer, Cocaine, 403
—— Electro-Magnet Extraction, 512
—— Minute Dosage of Cocaine, 498
—— Results of Foerster's Trituration, 374, 411
Meyerhofer, Scraping of Corneal Ulcers, 131
Michel, Chemical Composition of Lens, 374
—— "Text-Book of Ophthalmology," 313
Microphthalmos, 470
—— Double, 473
—— With Microcephalus, 91
Van Millingen, Clinique, 107
Minor, Gumma of Conjunctiva, 337
—— Bad Effects of Cocaine, 500
Miscellaneous Notes, 150, 433, 516
Mittendorf, Foerster's Method of Ripening Cataracts, 351
—— Polycoria, 501
Monakow, Optic-Nerve Centres, 475
Monocular Diplopia, 506
Del Monte, 138
—— Cataract-Extractions, 412
Mooren, Skin Diseases and Eye, 369
Morgagnian Cataract, 258, 350

Morton, Central Amblyopia in a Smoking Tabetic, 357
—— Unilateral Absence of Lachrymation, 121
Motais, Motor Apparatus of the Eye, 113
Motility, Case of Disturbance of, 387
Motor Apparatus of the Eye, 113
Moyne, Cysts of the Conjunctiva, 340
Mules, Steel Removed with Magnet, 353
Multiple Sclerosis, Eye Symptoms in, 422
Mumps Followed by Amaurosis, 368
Munk, Visual Spheres, 323
Murell, Cocaine, 399
Muscles and Refraction, 328, 386
—— Complicated Paralysis of Ocular, 331
—— Dynamic Equilibrium of the, 386
Museum, an Ophthalmological, 104
Musso, Pupil in Epileptics, 365
Myopia, Anatomy of Eyes Affected with, 384
—— Causes of, 479
—— In Schools, 117
—— In the Japanese, 480
—— Tenotomy in, 479
Myxœdema with Optic Atrophy, 511
Myxo-Sarcoma of the Optic Nerve with Hyaline Degeneration, 151

Nævus of Face and Eye, 142
Nagel, Circulation of the Cornea, 396
—— Optic Neuritis after Diphtheritis, 367
Namias, Antisepsis in Ophthalmic Surgery, 319
Needle, Removal of, with Magnet, 419
Neisser, Jequirity Ophthalmia not Due to Bacillus, 127
Nerves, 386
Nervous Diseases, Ophthalmoscopy in, 105
Nettleship, Central Scotoma in Diabetes, 357
—— Ophthalmitis Simulating Glioma, 140
Neuritis, Acute Unilateral, 417
Neuritis, Peripheral Retro-Bulbar, 358
—— In Meningitis, 515
Neuro-Retinitis, Cases of Sympathetic, 348, 409, 510
New-Born, Refraction and Optic Disc of, 322, 328
New York Ophthalmic and Aural Institute, Report of 4,695 Cases, 469
Nicati, Binocular Vision, 114
Nicotine Amaurosis, 356, 357
NIEDEN, Galvano-Cautery in Eye Diseases, 31
—— Second Series of One Hundred Cases of Eye Disease Treated with the Actual Galvano-Cautery, 455
—— Cocaine in Galvano-Cautery, 402
—— Leucoscope, 376
—— Neuropathic Keratitis, 132
—— Sympathetic Nerve, 365
Nitric Acid *vs.* Argentic Nitrate, 376
NORDMAN, Morgagnian Cataract with Transparent Fluid, Cortical, 258, 350
Norris, Hereditary Optic Atrophy, 510
—— Myxo-Sarcoma of Orbit, 488
Norton, Effect of Ice on the Eye, 110
—— Refraction and Headache, 515
—— Secondary Hemorrhage after Enucleation, 124
Nothnagel, Bilateral Paralysis of Oculo-Motor Nerve, 122
Novelli, Stretching of Infratrochlear Nerve in Glaucoma, 503
Noyes, Cocaine, 399
—— Dislocation of Lens into Vitreous, 412
Nys, Jequirity, 339
Nystagmus, a Curious Case of, 122

Ocular Affections in Constitutional Diseases, 419, 512
Ocular Muscles, Paresis of, 122
Oculo-Motor Paralysis, 122, 486
Ogier, Medico-Legal Aspect of Injuries of Iris, 362
Ole Bull, Ophthalmoscope and Syphilis, 367
Omerod, Paresis of the Ocular Muscles, 122

Ophthalmia in Asylums, 391
Ophthalmitis Simulating Glioma, 140
Ophthalmology, Text-Book on, 468
Ophthalmometry, 169
Ophthalmoplegia, after Diphtheritis, 367
—— Progressive, 486
—— Totalis, 331
Ophthalmoscope, a Refracting, 376
Ophthalmoscopic Image, Effect of Chloroform on, 373
Ophthalmoscopy, Text-Book on, 468
Ophthalmotonometer, 472
Optic Disc, Malformations of, 358
Optic Nerve, Affections of, 416
—— Anatomy of the, 379
—— Atrophy of, after Whooping-Cough, 420
—— Atrophy of, 144
—— Atrophy of peripheral, 509
—— Coloboma of, 359
—— Commotion of, 98
—— Congenital Anomalies of the, 113
—— Congenital Malformations of, 144
—— Experiments on, 108
—— Fibroma of, 417
—— Resection of, 223
—— Traumatic Division of, 361
Optic Neuritis, 359
—— After a Powerful Cathartic, 417
—— After Diphtheritis, 367
—— In Intra-Cranial Disease, 364
Optic Papilla, Swelling of, 510
Orbit, Abscess of, 488
—— And Neighboring Cavities, 387
—— Atheroma of, 487
—— Cavernous Angioma of, 487
—— Cellulitis of, from Carious Tooth, 388
—— Cystic Tumors of the, 333
—— Emphysema of, 388
—— Exostosis of, 123
—— Hydatid Cyst of, 123
—— Myxo-Sarcoma of, 488
—— Phlegmonous Suppuration of, from Anthrax, 334
—— Rare Tumor of the, 333
—— Syphilitic Periostitis of, 388
—— Tumors of, 123
Orbital Cellulitis, after Passing a Lachrymal Probe, 164
—— Death from, 122
Ortmann, Central Keratitis, 109
—— Experimental Keratitis, 131
Ostroffsky, Clinique, 468
Ottolengi, Color Perception in Syphilitics, 422

Paget, Eye in Hay-Fever, 368
Palmer, Puerperal Albuminuric Retinitis, 516
Pamard, New Iridectomy Operation, 109
Panas, Anæsthetics, 498
—— Antiseptics, 471
—— Cocaine, 404
—— Iridosclerotomy, 396
—— Ocular Rheumatism, 368
—— Toxic Amblyopia, 354
Panas and Vassaux, Tuberculosis of Cornea, 493
Pannus, 338
—— Walnut Oil in, 128
Panophthalmitis after Cocaine, 500
—— From Cystoid Cicatrix, 135
—— Six Months after Extraction, 352
Paralysis from Nicotine, 486
—— Ocular, after Diphtheritis, 367
—— With Alcaptose in the Urine, 516
Parant, Entropium Operation, 120
Parinaud, Eye Symptoms in Multiple, Sclerosis, 422
—— Paracentesis of Sclera in Glaucoma, 503
—— Visual Sensibility, 322
Parinaud and MacRie, Neuralgia and Ocular Paralysis, 485
Parisotti, Fibroma of Optic Nerve, 417
—— Jequirity Useless, 128
—— Papillomata of Conjunctiva, 393
Patrouillard, Ophthalmoplegia with Alcaptous Urine, 516
Peck, Bad Effects after Cocaine, 500
Pemphigus of Conjunctiva, 491
Pena, Jequirity, 339
Penmanship and Eye, 371.
Perimeter, Self-Registering, 54, 375

Pernice, Sublimate in Corneal Ulcers, 392
Peroxide of Hydrogen, 112
Peunow, Jequirity, 491
PFLUEGER, Antiseptic Ophthalmic Surgery, 111
—— Atropina and Glaucoma, 347
—— Clinique, 372
—— Congenital Anomalies, 112
—— Erythropsia, 353
—— Hemorrhagic Glaucoma, 135
—— Melano-Sarcoma of Conjunctiva, 492
—— Melano-Sarcoma of Sclero-Corneal Margin, 494
—— Metastatic Sarcoma of Choroid, 185, 345
—— Microcephalus with Microphthalmus, 91
—— Sarcoma of the Iris, 343
Phenol, Trichloride of, 490
Phlegmon of Eye, 371
Photometer, 320
Physiology of the Eye, 380
Picqué, Eye Put Out with Thumb, 418
Pier d'Houy, Aseptol, 473
—— Blepharoplasty, 482
—— Citro-Ammoniac of Copper, 473
—— Cocaine, 400, 495
—— Liver Disease Following a Blow on the Eye, 516
—— Scopolia Japonica, 473
Pilocarpine Useful in Choroidal and Retinal Exudations, 343
—— In Detachment of Retina, 416
—— In Eye Diseases, 406
Pinto, Karyokinesis, 316
Pitres, Agraphy, 514
Pollak, Jequirity, 340
—— Melano-Sarcoma of Orbit, 123, 335
Polycoria, 501
Pooley, Dacryoadenitis, 483
—— Orbital Cellulitis, 122
Posada-Armigo, Traumatic Color-Blindness, 327
Potassic-Bromide, Amaurosis from, 414
Potassic Chlorate in Conjunctivitis, 391
Pouchet, Eye of Unicellular Animals, 378
Pregnancy, Ocular Affections during, 368
Pribram, Studies on the Pupil, 113
PRINCE, A New Pterygium Operation, 16
—— Peroxide of Hydrogen, 112
Prisms, Headache Relieved by Use of, 331
—— Personal Experience with, 111
—— Curvature Produced by, 114
Prouff, Abnormal Curvature of Cornea in Astigmatism, 132
Prout, Glaucoma Following Tenotomy, 347
—— Plastic Exudative Cyclitis, 407
Pterygium, Operation for, 16
Ptosis, Bilateral Isolated, 387
—— Congenital Complete, 482
Puechagut, Rheumatic Tenonitis, 122, 331
Puerperal State, Eye Diseases in, 515, 516
Pulsating Exophthalmus, 335
Pupil, Centre for Movements of, 113
—— Cerebral Centres for Dilating, 322
—— Changes of, in Various Diseases, 422
—— Nerve Centres, for Dilation of, 477
—— State of, in Epileptics, 365
Pupillary Membrane, Cases of Persistent, 500
—— Operation for Persistent, 133
Purtscher, Cocaine, 398
—— Glasses for Corneal Curvature, 471
—— Punctated Keratitis, 395
Purulent Conjunctivitis, 491

Quaglino, Antisepsis in Cataract-Extractions, 139
—— Pupil, 324
Quinine Amaurosis, 417

Rampoldi, Angioma of Conjunctiva, 130

Rampoldi Clinique at Pavia, 372
—— Cocaine in Retinitis, 498
—— Congenital Complete Ptosis, 482
—— Curious Case of Disturbance of Motility of Eye, 387
—— Emphysema of Orbit, 388
—— Hypodermatic Calomel in Eye Diseases, 112
—— Indigestion and Vision, 422
—— Infiltration of Cornea, 493
—— Jequirity, 392
—— Kerato-Conus, 396
—— Luxation of Lachrymal Glands, 121
—— Lymphatic Infiltration of the Cornea, 132
—— Necrosis of Cornea, 341
—— Spontaneous Pulsation of Retinal Vessels, 142
—— Synchisis Scintillans, 353
—— Treatment of Histological Specimens, 379
Real, Pecten of Birds, 474
Recurrent Fever, Eye Diseases after, 150
Red Reflex, 313
Red Vision, 381
Redard, Lantern for Testing Color-Blindness, 383
Refraction, and Vision, 328
—— in Girls, 200
—— Errors in Determining, 384
—— In First Five Years of Life, 45
Reich, Sublimate in Trachoma, 391
—— "The Blind in Russia," 314, 373
Reichard, School Hygiene, 371
Reichenheim, Cocaine, 402
Reismann, Tubercular Choroiditis, 408
Remak, Coloboma of Optic Nerve, 329
Remedies, 376
Reports of Progress of Ophthalmology, 103, 313
—— of Manchester Royal Eye Hospital, 107
—— of Massachusetts Eye and Ear Infirmary, 107
—— of Van Millingen's Private Hospital, 107
Report of New York Ophthalmic and Aural Institute, 108
—— of Magdeburg Ophthalmic Institute, 108
Retina, Anæsthesia of, 508
—— Aneurism of Vessels in, 142
—— Anomaly of Venous Pulse of, 354
—— Cocaine in Hyperæsthesia of, 498
—— Color Perception in Different Parts of, 320
—— Commotion of, 356, 414
—— Concussion of, 146
—— Cones of, Action of, Light, on the 381
—— Cure of Detachment of, 355
—— Detachment of, Cured by Iridectomy, 142
—— Embolism of Artery in, 263
—— Glioma of, 416
—— Hemorrhage in, 507
—— Malarial Hemorrhages of, 515
—— Operation for Detachment of, 508
—— Pathology of, in Bright's Disease, 149
—— Peculiar Ophthalmoscopic Appearances in the, 141
—— Photopsies of, 477
—— Pilocarpine and Puncture in Detachment of, 416
—— Spontaneous Cure of a Detachment of, 142
—— Spontaneous Pulsation of Vessels in, 142
—— Supporting Tissue of, 321
—— 300 Cases of Detachment of, 355
—— Traumatic Alterations in Pigment of, 146
—— Venous Pulse of, 323
Retina and Choroid, Rupture of, with a Plush Ball, 419
—— and Functional Disturbances, 414
Retinal Detachment, Cure of, Spontaneous, 142
—— By Iridectomy, 142
—— Causes of, 142, 143
Retinitis Albuminurica, 149
—— Amaurosis from, 355
—— Anatomy of, 415
—— Pigmentosa, 142, 354

Retinitis Unilateralis, 367
Reuss, Fungi in Lachrymal Ducts, 120
Revolat, Partial Tenotomy in Insufficiency, 330
Reymond, Accommodation and Convergence, 325
Reynolds, Cystoid Cicatrix, 133
Rheumatic Ophthalmia, 149
Rheumatism of the Eye, 368
—— With Ophthalmia Gonorrhoica, 490
Ricco, Curious Subjective Sensations, 381
Risley, Hypermetropia Becoming Myopia, 479
—— Sympathetic Neuro-Retinitis, 504
Rohm, Exophthalmic Goitre, 124
Ruebel, Amaurosis from Potassic Bromide, 414
Rumszewicz, Macula Coloboma, 507
Russell, Graves' Disease, 334
Russia, Blind in, 373
Rydel, Detachment of Retina, 416

Saint Martin, Foreign Body in Eye Fifteen Years, 418
—— Gumma of Sclera, 397
—— Pearly Cyst of Iris, 405
—— Phlegmon of Lid, 384
—— Cauterization in Blepharospasm, *Ib.*
—— Gangrene of Lid, *Ib.*
—— Facial Paralysis, *Ib.*
—— Gangrene of Lid in Scarlatina, 385
—— Rupture of Choroid, 406
—— Suppurating Gumma of Iris, 405
Sachs, Glaucoma Caused by Homatropina, 347
Salomonsen, Jequirity Ophthalmia not Bacterial, 127
Sarcoma of Choroid, 407
—— Of Lachrymal Gland, 386
—— Diagnosis of Intra-Ocular, 407
Sargent, Anatomy of Glaucomatous Eyes, 409
Sattler, Antiseptics in Ophthalmic Surgery, 112
—— Berberine and Hydrastine, 491
Sattler, Carcinoma of the Eyelids, 19
—— Exophthalmus, 190
Schadek, Syphilitic Affections of Cornea, 395
Schaefer, Anatomical Description of Irido-Choroiditis, 343
—— Chronic Tuberculosis of the Eyes, 344
—— Eyes of Deaf and Dumb, 104
Schatz, Blennorrhœa Neonatorum, 125
Schell, Embolism of Central Retinal Artery, 507
—— Tuberculosis of Iris, 133
Schenkl, Cocaine, 398
—— Death after Blepharoplasty, 482
—— Jequirity Useless, 338
Scherk, Strabismus Operation, 121
Schiefferdecker, Supporting Tissue of Retina, 321
Schiess-Gemuseus, Clinique, 315
—— Congenital Staphyloma of Cornea, 394
—— Congenital Anomalies of Eye, 378
Schischm, Seeds of, in Trachoma, 321
Schleich, Xerosis of Conjunctiva, 394
Schlesinger, Retinitis Brightii, 149
Schmidt-Rimpler, Antiseptic Action of Cocaine, Corrosive Sublimate, and Chlorine Water upon Dacryocystitic Secretions, Tested by Inoculations of the Cornea, 447
—— Commotio Retinæ, 356
—— Diphtheritic Paralysis of Accommodation, 118
—— Ophthalmology and Ophthalmoscopy, 468
—— Refracting Ophthalmoscope, 376
Schnabel and Sachs, Embolism of Retinal Artery, 263
Schneller, Excision of Fornix in Trachoma, 392
Schoeler, Hemianopsia, 143
—— Optic Nerve in Constitutiona Diseases, 315
—— Xerosis of Conjunctiva, 338
School-Children, Myopia in, 117
—— Refraction of, 383
Schreiber Clinique, 469

Schubert, Penmanship and Eye, 371
Schuchardt, Use of Schischm in Eye Diseases, 321
Schulin, Proper Indications for Jequirity, 393
Schulten, Von, Circulation of Eye and Brain, 377
Schultz, Xerosis of Conjunctiva, 394
SCHWEIGGER, Commotion of Optic Nerve, 98
—— Conjunctival Vesicles, 100
—— Cocaine, 496
—— Resection of the Optic Nerve, 223
—— Resection of Optic Nerve (present volume), 375
Sclera, Affections of, 389
—— Conjunctival Flap in Injuries of the, 397
—— Gumma of the, 397
—— Melano-Sarcoma of, 494
—— Rupture of, 418
Scleritis, Pilocarpine in, 494
Scopolia Japonica, 473
Scotoma, Central Positive, 470
—— Traumatic Zonular, 416
Sedan, Intermittent Catarrhal Ophthalmia, 490
Seely, Astigmatism, 479
—— Yellow Oxide and Eserine, 125
Seggel, Military Hospital Report, 315
—— Refraction and Vision, 328
Severi, Jequirity in Toxicology, 340
Shaffner, Rupture of Retina and Choroid with a Plush Ball, 419
Shears, Tobacco Amblyopia, 357
Sheglinsky, Movements of the Pupil, 325
Simi, Capsulotomy, 413
—— Constitutional Effects of Jequirity, 128
—— Medical Treatment of Glaucoma, 347
—— Optic Neuritis after a Powerful Cathartic, 417
Singhalese, Eyes of the, 371
Sinus, Disease of Frontal, 487
Skin, Diseases of, and the Eye, 369
Skull, Amaurosis in Deformity of, 359
Smith–Priestly, Reflex Amblyopia, 356
Smith-Priestly, Simple Ophthalmoscope, 320
—— An Ophthalmoscopic Lamp, 320
Snell, Steel Removed from Vitreous, 146
—— Suture in Scleral Injuries, 397
—— Sympathetic Ophthalmia, 137
—— Thermometry after Catarac-Extractions, 351
Souvquière, Foerster's Corelysis, 343
Spalding, Puerperal Albuminuric Retinitis, 516
—— Sympathetic Neuro-Retinitis, 136
Spectacle-Frames, Electrical, 376
Speculum, 320, 375
Spinal Diseases, Eye Symptoms in, 366
Spontaneous Absorption of a Cataractous Lens, 138
Squint, Development of, 485
Starr, Visual Area of Brain, 114
Statistical Papers, 314, 371, 468
Stefanini, Xerosis of Conjunctiva, 131
Steffan, Clinique, 373
—— Pemphigus of Conjunctiva, 491
—— Xerosis of Conjunctiva, 338
STEVENS, Steel Removed by Means of a Magnet, 196
—— Cocaine, 500
Stilling, Development of Squint, 485
Stood, Amaurosis in Deformity of the Skull, 359
—— Malformations of the Optic Disc, 358
Story, Aneurism of Retinal Vessels, 142
—— Entropium and Trichiasis, 481
—— Epithelioma due to Carbolic Acid, 482
—— Optic Neuritis, 359
—— Rare Tumor of Orbit, 333
Strabismus, Operations for, 121, 484
—— Spasmodic Internal, 331
Streatfeild, Operation for Ectropium, 120
St. Thomas' Hospital Report, 372
Styles, Leaden, in Lachrymal Obstructions, 386

Subjective Sensations of Vision, 381
Sublimate in Eye Diseases, 391, 447, 473
Swanzy, Cicatricial Ectropium, 482
—— Hemi-Achromotopsia, 355
Symblepharon, Operation for, 130
Sympathetic Neuroretinitis, 504
Sympathetic Nerve, Affection of the, 365
Sympathetic Ophthalmia, Recoveries from, 12, 135
—— Rare Cases of, 135
—— With Papillitis, 136
—— With Neuroretinitis, 136
—— Paralysis of Accommodation in, 136
—— Necessity of Immediate Enucleation in, 136
—— with Good Results in the Sympathizing Eye, 137
—— Cured by Freeing Incarcerated Iris, 137
—— Mercurials in, 137
—— Cases of, 347, 409, 411
—— Pathogeny of, 410
Synchisis Scintillans, 353
Syphilitic Cataract, 505
Syphilis, Ophthalmoscope in, 367
Szili, Ophthalmoplegia Chronica, 486
Szilagye, Von, Intensity of Colors, 326

Tabes, Optic Atrophy in, 365
—— Ocular Paralysis in, 365
Taenzerles, Iodoform in Diphtheritic Conjunctivitis, 125
Tartuferi, Karyokinesis, 317
Taylor, Cocaine in Conjunctivitis, 499
Teillais, Spontaneous Luxation of Lens, 505
Tenonitis, 332
Tenotomy Followed by Glaucoma, 347
Tepljaschin, Clinique, 105
Terrier, Cauteries in Ec- and Entropium, 482
—— Cocaine and Chloroform, 498
—— Thermo-Cautery in Entropium, 385
Terson, Mercurials in Chorio-Retinitis, 345
—— Retinitis Albuminurica, 149
—— Sclero-Iridectomy in Glaucoma, 503
Thalberg, Xerosis of Conjunctiva, 131
Thea, Massage, 342
Thebaine in Ophthalmology, 376
Theobald, Trituration of Cataract, 139
—— Vaseline Cerate, 112
Thermometer in Cataract-Extractions, 351
Thermo-Cautery, in Entropium, 385
—— In Lachrymal Diseases, 483
Thieron, Dangers from Jequirity, 491
Tissue, Migration of, 501
Tobacco-Amblyopia in Women, 356
Tooth, Attempted Extraction of, Total Blindness of Eye, 177
—— Cellulitis from Carious, 388
—— Extraction of a, followed by Orbital Cellulitis, 332
Trachoma Cured by Erysipelas, 390, 393
—— Excision of Fornix in, 392
—— Galvano-Cautery in, 338
—— Sublimate in, 391
—— Treatment of, 125, 126
Transplantation, 470, 483
Treitel, Central Positive Scotoma, 470
—— Perception of Light, 476
—— Hemeralopia, 476
Trelat, Epithelioma of Lid, 480
Trichiasis, 330
—— Cauteries in, 482
—— Operation for, 120
Troitzky, Jequirity, 393
Tuberculosis of the Choroid, 134, 408
—— Of Conjunctiva, 491
—— Of the Eye, 134, 400
—— Of the Iris, 133
—— Of Various Parts of the Eye, 148
Tuffier, Traumatic Polyuria and Hemianopsia, 422
Turnbull, L., Cocaine, 498
Tweedy, Secondary Divergent Strabismus, 121

Uffelmann, Credé's Method, 491
Uhthoff, Anatomy of Optic Nerve, 379
—— Atrophy of Optic Nerve, 144
—— Diphtheritic Paralysis, 486
—— Ophthalmoplegia Totalis after Diphtheritis, 367
—— Ophthalmoscopy in Nervous Diseases, 105
—— Optic Nerve in Constitutional Diseases, 315
Uletomy, Result of, 315
Ulrich, Refraction and Optic Disc of New-Born, 322, 328
Unicellular Animals, Eyes of, 378
Uræmic Amaurosis, 420

Vaseline Cerate, 112
Velardi, Aural Sensations of Color, 383
Vennemann, Unorganized Ferment in Jequirity, 129
De Vincentiis, Microphthalmos, 473
Vision, Cerebral Localization of Disturbances of, 513
—— Sudden Loss of, 509
—— Theory of, 381
Visual Field, Charts for, 109
—— Concentric Limitation of, 515
—— Fixation for, 111
Visual Functions, Physiology of, 322
Visual Spheres, 323, 476
Vitreous Body, 506
—— Affections of, 413
—— Anatomy of the, 378
—— Dislocation of Lens into, 412
—— Foreign Bodies in, 353
—— Foreign Bodies Removed from, 146
—— Iron in, Removed with Magnet, 414
Vitreous Opacities, Electrical Treatment of, 414
Vossius, Congenital Coni, 510
—— Granular Conjunctivitis, 338
—— Jequirity, 127
—— Lepra of Eye, 420
—— Optic Atrophy in Malformations of Skull, 359
Vossius, Orbital Cellulitis after Tooth-Extraction, 332
Vulpian, Cocaine, 404

Wadsworth, Curvature Caused by Prisms, 114
—— Myxœdema, with Optic Atrophy, 511
—— Traumatic Zonular Scotoma, 416
—— Tuberculosis of Iris and Ciliary Body, 133
Waldhauer, Diabetic Cataract, 506
Walker, Mercurials in Sympathetic Ophthalmia, 137
—— Sixty-three Cataract-Extractions, 138
Walnut-Oil in Pannus, 128
Walter, Detachment of Retina, 355
Warner, Tubercle of the Choroid, 134
Warlomont, Empiricism in Ophthalmology, 371
—— Jequirity, 393
—— Pannus, 338
Weber, Cocaine, 402
Webster, Neuritis in Meningitis, 515
—— Thirty-five Cataract-Extractions, 138
—— Traumatic Recurrent Hypæmia, 419
DeWecker, Cataract-Extraction, 413
—— Measurement of Kerato-Conus, 132
—— Efficacy of Jequirity, 127
—— Strabismus Operation, 484
—— Suture for Entropium, 481
Weiss, Anatomy of the Myopic Eye, 384
Westphal, General Paralysis and Blindness, 365
White, Fifty-two Cataract-Extractions, 413
Wicherkiewicz, Clinique, 315
—— Cocaine, 499
—— 3,369 Cases, Report of, 469
Widmark, Bacteria of Dacryocystitis, 395
—— Gonococcus in Blennorrhœa, 490
—— Jequirity Non-Bacillic, 338

Wiesbaden Clinique, 469
Wilbrand, Concentric Limitation of Field, 515
Wilbrandt, Ophthalmoscopic Diagnosis of Cerebral Affections, 143
Williams, E., Chancre of Eyelid, 119
Wilson, Cocaine and Corneal Haziness, 499
Wolfberg, Perception of Light, 476
Wolfe, Detachment of Retina, 508
Wolfring, Glands of Tarsal Cartilage, 475
Women, Cases of Tobacco-Amblyopia in, 356
Word-Blindness, 148, 514
Woukchewich, Excision of Conjunctiva in Trachoma, 125
Wulfberg, Tests for Sensibility to Light, 322

Yellow Spot, Anomaly at, 474
Yucas, Gonorrhœal Rheumatism with Ophthalmia, 490

Zacharywitsch, Cocaine, 398
Zeglinski, Iris, Movements of, 478
Zehender, Apparatus for Determining Convergence, 320
Zieminsky, Cocaine, 398
Zonula, Anatomy of, 474

GENERAL INDEX TO VOLUMES VIII. TO XIV.

BOTH INCLUSIVE.

Abstract of American Ophthalmological Literature, viii., 532; ix., 118, 229, 351, 481; x., 103, 234, 344
Accommodation and Refraction, Literature of, viii., 284, 520; ix., 245, 510; x., 110, 245, 361; xi., 103, 109, 260, 377, 511; xii., 105, 259, 504; xiii., 461, 522; xiv., 117, 327, 388, 478
ADAMUEK, E., Some Observations upon Tumors of the Eye, xi., 190
Adenoma of Lachrymal Gland, ix., 288
Advancement, Operations for, x., 346
Alcohol, Amaurosis, viii., 363
—— Amblyopia, xiii., 551
ALSBERG, ALBERT, On the Detection of Mercury in the Urine after Calomel has been Dusted into the Conjunctiva, ix., 399
ALT, ADOLPH, A Case of Adenoma of the Lachrymal Gland, ix., 288
—— "A Treatise on Ophthalmology for the General Practitioner," xiii., 294
—— An Improved Method of Operating in Certain Cases of Symblepharon, ix., 293
—— Contributions to the Pathological Anatomy of the Human Eye, viii., 103
—— "Lectures on the Human Eye in its Normal and Pathological Relations," xi., 77
Amaurosis, followed by Homonymous Superior Hemianopsia, xiii., 301
—— From Concussion — Recovery, ix., 43
—— From Lead, viii., 363; from Abuse of Alcohol, viii., 363
—— From Lesions of the Eyebrow and Orbital Region, x., 105; xi., 117
Amaurosis, from Microphthalmos, viii. 372
—— From Quinina, ix., 41, 81; x., 81, 215, 221, 461
—— In One Eye, Primarily, xi., 33
American Medical Association, Abstract of Papers Read before, in 1880, ix., 345
—— In May, 1881, S. M. Burnett, x., 232
American Ophthalmological Society, Reports of Meetings, by H. Knapp, ix., 336; x., 318; xi., 403; xiii., 287
Amyloid Degeneration, of the Conjunctiva, x., 171
—— Of the Eyelids, E. Raehlmann, xi., 466
—— Infiltration of Conjunctiva, viii., 73
—— Tumors of the Conjunctiva, Clinical Significance of, Theodor Kubli, xi., 149
Amblyopia, Autopsy in a Case of Central, xii., 291
—— From Menstrual Hemorrhage in Typhoid Fever—Recovery of Sight, Cornelius Williams, xiii., 397
Anæmia, Condition of the Eyes in Two Cases of Fatal, Boerne Bettman, xi., 12
—— Fundus of Eye in, viii., 281
Anæsthetics in Bright's Disease and in Cataract-Extraction, x., 319
Anatomy, General Review of, viii., 127, 413; ix., 96, 357; x., 108; xi., 99, 254, 371, 500, 507; xii., 243, 495; xiii., 456, 515; xiv., 112, 321, 377, 473
ANDREWS, J. A., Syphilitic Gumma of the Sclera, xi., 458
Aneurism, Arterio-Venous, in the Retina, xii., 32

Aneurismal Tumor of Orbit, x., 167
Animals, Perception of Light and Color in, xiv., 116
Aniridia Traumatica, Case of, x., 169
Anomalies, of the Eye, F. Dimmer, xiv., 72
—— Ophthalmological, P. D. Keyser, x., 261
Anophthalmos, Case of Congenital, viii., 371
Anterior Chamber, xi., 119
—— Development of, W. C. Ayres, viii., 1
—— Eyelash in the, x., 422
—— Literature of Foreign Bodies in the, xiv., 361
—— Removal of Foreign Body from, Nine Years after Entrance, ix., 388
—— Traumatic Suspension of the, Cured with Eserin, H. Knapp, x., 451
Anthrax, Eye Diseases from, xiv., 334
Antisepsis, x., 116, 333; xii., 94
Antiseptic Agents, Comparative Value of, in Ophthalmology, xiv., 447
Aphakia, Monochromatic Aberration of Eyes in, William Harkness, xii., 9
Aqueous Humor, xii., 255
Argyle-RobertsonPupil, xi., 277
Arlt, Von, Ferdinand, "Clinical Studies on Diseases of the Eye" (Translated by Lyman Ware), Notice of, xiv., 424
Arterial Pulsation in Retina, xii., 147
Artificial Leech, A Modification of the, F. B. Loring, viii., 529
Astigmatism, Apparatus for Determining, xii., 240; xiii., 511
—— Curious Case of, x., 234
—— Focal Lines of, xi., 110
—— Notice of, x., 235
—— Knapp's Method of Determining, ix., 347
Asthenopia, Neurasthenic, xii., 480
•Atropina, Dangers from, in Cases of Foreign Bodies in the Iris, xi., 41
—— Duboisina, and Homatropina, Comparative Effect of, upon the Eye, H. Schaeffer, x., 196; Risley, x., 323
—— Effect of, upon the Eye, H. Schaeffer, x., 196
Atrophy of Optic Nerve, Case of Stationary, viii., 364
AUB, J., Ectropion Treated by Transplantation of Flaps without Pedicle, viii., 94
AUGSTEIN, Disturbance of the Color-Sense in Neuritis, xiv., 435
AYRES, S. C., Retro-Bulbar Hemorrhage, x., 42
AYRES, S. C., Sympathetic Inflammation, xi., 199
AYRES, W. C., A Case of Glioma of the Retina, with Some Noteworthy Features, ix., 174
—— Contributions to the Knowledge of New Formations in the Eye, x., 269
—— Contributions to the Pathology of Sympathetic Ophthalmia, x., 277
—— On the Development of the Cornea and the Anterior Chamber, viii., 1
—— The Blood Circulation at the Yellow Spot, xi., 476

Bandage, New, for the Eye, S. Theobald, ix., 154
BARABASCHEFF, PAUL, Intra- and Extra-Ocular Endothelioma, ix., 420
Base of Skull, Fracture of, with Amaurosis and Hemianopsia, A. Nieden, xii., 387
BECKER, OTTO, "On the Anatomy of the Healthy and Diseased Lens," xii., 528
—— The Vortex and the Nuclear Arch of the Human Lens, xii., 169
BESELIN, OTTO, Examination of the Refraction and Basal Line of the Eyes, and of the Dynamic Relations of the Lateral Muscles in Girls from Five to Eighteen Years of Age, xiv., 200
BETTMAN, BOERNE, The Condition of the Eyes in Two Cases of Fatal Anæmia—an Anatomical Investigation, xi., 12
Bibliography, General, viii., 289, 525; ix., 252; xi., 79, 243, 360, 490; xii., 231, 484; xiii., 449, 507; xiv., 103, 313, 370, 467
BIRNBACHER, ALOIS, A Case of Ectopia of the Eyeball by Osteophytes from the Roof of the Orbit, with Consecutive Pneumatosis of the Supra-Orbital Region, xii., 404
Blepharoplasty without a Pedicle, ix., 339; xiii., 287
Blepharospasm, Case of Tonic, Relieved by Iodine Tincture, ix., 283
—— Stretching of the Lids in, xi., 113
Blindness, after an Eclipse, xiii., 497
—— After Fracture of the Base of the Skull, F. P. Capron, xi., 335
—— by Pressure, x., 111
—— Following Unsuccessful Extraction of a Canine Tooth, xiv., 177
—— from Facial Erysipelas, xiii., 265
—— Prize Essays on, xii., 167
—— Statistics of, xii., 232

Book Notices, Minor, xiv., 552
Boroglyceride in Trachomatous Conjunctivitis, Charles S. Turnbull, xiii., 57
BOWEN, WM. SHAW, Long-Continued Presence of a Spiculum of Copper in the Cornea without Exciting Apparent Irritation, xi., 333
Brain, Abscess of the, with Double Optic Neuritis, Caries of Right Orbit, and Orbital Cellulitis, George S. Norton, xiii., 30
—— Diseases, with Ocular Symptoms, xii., 365
—— Vascular System of, in Connection with That of the Eye, xii., 237
—— and Spinal Marrow, Ocular Lesions after Injuries of the, A. Nieden, xii., 387
Bright's Disease, Eye in, xiii., 279
BROWN, U. H., Jequirity, xiii., 168
BROWNING, W., Binocular Ophthalmotrope, x., 249
BULL, C. S., On the Removal of Foreign Bodies from the Eye, ix., 72
BUMSTEAD, S. J., The Unequal Contraction of the Ciliary Muscle, xiii., 208
BURNETT, S. M., A Case of Acute Chemosis, ix., 157
—— A Case of Coloboma of the Choroid at the Macula Lutea, Unaccompanied by Coloboma of the Iris, xi., 461
—— A Case of Great Swelling of the Eyelids and Face Following an Unsuccessful Attempt to Extract the Upper Canine Tooth on the Left Side—Abscess of the Orbit—Total Blindness—Atrophy of the Disc—Obliteration of the Retinal Vessels, xiv., 177
—— A Case of Retinitis Punctata Albescens, xii., 22
—— Abstract of Ophthalmological Papers Read before the Am. Med. Ass., June, 1880, ix., 345
—— A Systematic Method for the Education of the Color-Sense in Children, viii., 409
—— Character of the Focal Lines in Astigmatism, xii., 310
—— Circum-Corneal Hypertrophy of the Conjunctiva (Vernal Catarrh of the Conjunctiva—Spring Conjunctivitis), with Some Peculiarities of Its Appearance in the Negro, x., 414
—— Color-Perception and Color-Blindness, x., 1
—— Epiphora from Congenital Atresia of the Puncta Lachrymalia—Successful Operation for Its Relief, xiii., 53
BURNETT, S. M., Four Text-Books on Ophthalmology, xi., 74
—— Large Tubercular Tumor of the Choroid—Enucleation of the Eye—Recurrence of Ulceration in the Conjunctiva and Lid—Death from Tuberculosis of the Lungs, xii., 315
—— Ophthalmometry with the Ophthalmometer of Javal and Schioetz, with an Account of a Case of Kerato-Conus, xiv., 169
—— Refraction in the Principal Meridians of a Triaxial Ellipsoid, with Remarks on the Correction of Astigmatism with Cylindrical Glasses, and an Historical Note on Corneal Astigmatism, xii., 1
—— Results of an Examination of the Color-Sense of 3,040 Children in the Colored Schools of the District of Columbia, viii., 191
—— The Comparative Frequency of Eye Diseases in the White and Colored Races in the United States, xiii., 187

CALLAN, PETER A., Peculiar Circulation of Retinal Arteries and Veins, x., 138
Calomel, Absorbed by Blood-Vessels, when Dusted into the Eye, A. Alsberg, ix., 399
—— Serious Effects of, on the Eyes, xi., 49
CAPRON, F. P., A Case of Blindness after Fracture of the Base of the Skull, xi., 335
Capsule, On the Extraction of the Anterior, R. Foerster, xi., 355
—— Peripheral Division of, x., 295, 341; xii., 100
Carcinoma of the Eyelids, O. Purtscher, x., 4
—— The Treatment of the Superficial and Infiltrating Varieties of, Robert Sattler, xiv., 19
Carotid, Atheroma of, and Cataract, xiii., 275
Cataract, Alleged Cure of, by Electricity, x., 117, 320
—— Diabetic, viii., 353
—— On the Maturity of, and Its Artificial Maturation, R. Foerster, xi., 344
—— Extraction of, by Jacobson's Method, E. Franke, x., 121
—— Anæsthesia in, x., 320
—— Bibliography of, x., 135
—— Deaths after, x., 319

Cataract, Dislocation of Lens during, xiii., 389
—— Flap Method, xiii., 372
—— Followed by Sympathetic Ophthalmia, ix., 337; xii., 139
—— in an Infant Six Months Old, J. J. Chisholm, xi., 326; xiii., 390
—— Preliminary Iridectomy in, xiii., 381
—— Report of 63 Cases of Extraction of, W. Cheatham, xiv., 1
—— Report of 1,420 Cases of Extraction of, O. Eversbusch and J. Pemerl, xiii., 311
—— Report of, and Remarks on, a Sixth Hundred of Extractions of, H. Knapp, viii., 200
—— Report of a Seventh Hundred of Extractions of, with Historical and Critical Remarks, Particularly on the Peripheral Opening of the Capsule, H. Knapp, x., 295
—— Report of an Eighth Hundred of Extractions of, H. Knapp, xii., 69
—— under Unfavorable Circumstances, C. J. Kipp, ix., 171
—— within the Capsule, H. Pagenstecher, x., 152; xiii., 369. (See also, under Statistical Papers and Lens.)
Cautery, Literature of, viii., 425; ix., 113, 369, 490; x., 117; xii., 274
Character of the Focal Lines in Astigmatism, S. M. Burnett, xii., 310
CHEATHAM, W., Report of 63 Cases of Extraction of Cataract, xiv., 1
Chemosis, A Case of Acute, S. M. Burnett, ix., 157
Child, Soul of the, xi., 509
CHISHOLM, JULIAN J., A Glioma of the Right Eye Spreading by Metastasis through Many Periosteal Centres, xiii., 47
—— An Obscure Case of Nerve-Pathology Accompanying Optic Neuritis, xi., 239
—— Cataract-Extraction with Iridectomy in an Infant Six months Old, xi., 326
—— Congenital Paralysis of the Sixth and Seventh Pairs of Cranial Nerves in an Adult, xi., 323
—— Extensive Ravages from Lupus, with Subsequent Cicatrization, Leaving but One Small Hole in the Face, Which Represents Both Mouth and Nose, and with Complete Closure of the Anterior Nasal Orifices, xi., 234
—— Jequirity, xiii., 118
—— Rupture of the Eyeball in Its Posterior Surface from a Blow on the Face, xi., 44
CHISHOLM, JULIAN J., Salicylate of Sodium in the Treatment of Iritis, ix., 166
—— Sympathetic Ophthalmia, Two Cases of, under Peculiar Circumstances—Sequel of Surgical Operations, x., 265
—— Tetanus Resulting Fatally from Enucleation of an Eyeball, ix., 48
—— Two Cases of Malignant Tumor of the Sphenoidal Cavities Implicating Vision, xi.,53
Chlorine-Water, Antiseptic Action of, xiv., 447
Chloro-Sarcoma, xii., 165
Choked Disc, Caused by a Cerebral Tumor, viii., 226
Chorio-Retinitis, Case of Latent, viii., 365
—— Pigmentosa, J. N. Oeller, ix., 1
Choroid, Colloid Excrescences of the, xiv., 64
—— Coloboma of, without Coloboma of the Iris, S. M. Burnett, xi., 461
—— Congenital Anomaly in the, Ernst Fuchs, xii., 37
—— Contributions to the Pathological Anatomy of the, F. Dimmer, xiv., 60
—— Metastatic Sarcoma of the, E. Pflueger, xiv., 185
—— Sarcoma of, viii., 345, 372; x., 140, 269, 325
—— Tubercular Tumor of,—Enucleation—Death from Tuberculosis of the Lungs, S. M. Burnett, xii., 315
—— and Ciliary Body, Literature of Cases of Diseases of, xii., 134, 498; xiii., 268, 489, 536; xiv., 134, 342, 406, 474, 501. (See also Uveal Tract.)
—— and Iris, On the Pathological Anatomy of Coloboma of the, J. Thalberg, xiii., 253
Choroidal Exudation, Proliferation of Endothelium in a, xiv., 60
Chromatokinopsias, Studies on, G. Mayerhausen, xiv., 81
Ciliary Body, Sarcoma of, x., 140
Ciliary Muscle, the Unequal Contraction of the, S. J. Bumstead, xiii., 208
Cilio-Retinal Blood-Vessels, xii., 149
Clinical Contributions, St. John Roosa and E. T. Ely, ix., 41
Cocaine, H. Knapp, xiii., 402
—— Antiseptic Action of, xiv., 447
—— In Using the Galvano-Cautery, xiv., 456, 496
—— xiv., 398, 494

Cocaine, On the Measurement of the Degree of Anæsthesia produced by, Lucien Howe, xiv., 243
COGGIN, DAVID, A Case of Pulsating Exophthalmus, Ligation of the Left Common Carotid—Death, xii., 187
COHN, H., Comparative Determination of the Acuteness of Vision, and of the Perception of Colors, by Daylight, Gaslight, and the Electric Light, ix., 51
—— Eye Diseases from Masturbation, xi., 428
—— Quantitative Determination of the Color-Sense, ix., 61
Coloboma of the Choroid and Iris, xiii., 253
—— of the Sheath of the Optic Nerve without Additional Fissure in the Uveal Tract, A. Nieden, viii., 501
Color-Blindness, A New and Convenient Test for, Richard Hilbert, xiii., 297
—— Bibliography of, xiii., 297; in Denmark, de Fontenay, x., 8
—— Observations on, E. Pflueger, ix., 435
Color-Perception and Color-Blindness, S. M. Burnett, x., 1
Color Question, Present Aspect of, J. Stilling, viii., 164
Color-Sense, Acuteness of, by Day- Gas- and the Electric Light, ix., 51
—— Disturbance of, in Neuritis, Augstein, xiv., 435
—— For Reflected Color by Daylight, Determination of a Standard of, Charles A. Oliver, xi., 65
—— Literature of, viii., 130 417; ix., 107; x., 105, 113; xi., 105, 257, 376, 512; xii., 257, 502; xiii., 300, 460, 522; xiv., 116, 325, 381
—— Measure, Description of a, C. A. Oliver, x., 438
—— Quantitative Determination of the, H. Cohn, ix., 61
—— Results of an Examination of the, in 3,040 Children in the Colored Schools in the District of Columbia, S. M. Burnett, viii., 191
—— Systematic Method of Educating the, in Children, S. M. Burnett, vii., 409
Colored Light, Chemical Action of, ix., 366
Comparative Anatomy, xii., 250; xiii., 458, 519
Concussion of the Brain and Spinal Marrow, Slight Initial Symptoms, Followed by Progressive Spinal Ataxia, Exophthalmus of Both Eyes and Atrophy of Both Optic Nerves, xii., 398
Concussion of Eye, by a Bullet, x., 329
—— Of the Retina, Amaurosis from, ix., 43
Conical Cornea, the Actual Cautery in, x., 233. (See also Kerato-Conus.)
Conjunctiva, Amyloid Degeneration of the, E. Raehlmann. x., 171
—— Amyloid Tumors of, xi., 149
—— Circum-Corneal Hypertrophy of the, S. M. Burnett, x., 414
—— Croup of the, H. Knapp, xi., 1
—— Diseases of, xii., 5, 19
—— Formation of Vesicles on the, xiv., 100
—— Gumma of the Ocular, J. L. Minor, xii., 228
—— Lipoma of, xiii., 196
—— Osteoma of, xii., 523
—— Sarcoma of, x., 345
—— Sarcoma of, with Amyloid Infiltration, J. S. Prout and C. S. Bull, viii., 73
—— Transplantation of Rabbit's, xii., 524
—— Tumors of, xii., 126
Conjunctiva, Cornea, and Sclera, General Review of Literature of, viii., 277, 416, 514; ix., 237, 238, 501; x., 241, 355; xi., 119, 264, 383, 506; xii., 119, 245, 268, 495, 517; xiii., 471, 530; xiv., 124, 335, 389, 475, 488
Conjunctivitis, Follicular, xii., 123
Constitutional Diseases, Curability of, by Glasses, ix., 482
Copper Spray in Eye Cases, ix., 112
Corelysis, R. Foerster, xi., 354
Cornea, Actual Cautery in the Treatment of Serpentic Ulcer of the, Emil Gruening, xiv., 28
—— Anæsthesia of, x., 349
—— Bit of Copper in, for Twenty Months without Exciting Apparent Irritation, Wm. Shaw Bowen, xi., 333
—— Blisters of, xi., 124
—— Curvature of, xiv., 115
—— Degeneration and Regeneration of the Nerves of the, xi., 252
—— Nutrition of, xi., 256
—— Development of, W. C. Ayres, viii., 1
—— Fragment of Steel Imbedded in the, for Two Years, without Causing Irritation, H. Knapp, xi., 232
—— Gangrene of, from Inanition, J. Thalberg, xii., 211

Cornea, Literature of (See Conjunctiva)
—— Nutrition of, xii., 495
—— Opacity of, in Glaucoma, x., 460
—— Transplantation of, ix., 497
—— Transverse Calcareous Film of, E. Nettleship, viii., 293
Corneal Abscess Consequent on Blennorrhœa Neonatorum, viii., 239
CORNWELL, HENRY G., A Compound Dermoid Cyst of the Orbit, xi., 338
Correction, Ole Bull, xii., 527
—— H. S. Oppenheimer, xi., 516
CRITCHETT, GEORGE, Biographical Notice of, xi., 517
Croup of Conjunctiva, H. Knapp, xi., 1
Cyclopia, xi., 501
Cyst of Iris, xi., 129
Cysticerci, viii., 142
Cysticercus Cellulosæ, Case of, in the Vitreous—Extraction—Preservation of the Eye and of the Visual Power Present, C. G. Haase, xii., 64
—— Intra-Ocularis, Case of, E. Vogler, ix., 272. (See also Parasites and Foreign Bodies.)
Cystoid Degeneration of the Right Cerebellar Hemisphere, Neuritis Optica of both Eyes, Slight Disturbances of Co-ordination—Death, xii., 378

DA GAMO, PINTO, Description of an Eyeball Affected with Coloboma of the Iris and Choroid, xiii., 216
Death in a Case of Glaucoma, x., 98
DERBY, HASKET, Jequirity, xiii., 115
—— Three Cases of Hydrophthalmus Treated with Iridectomy, xi., 37
Dermoid Cyst, A, of the Orbit, xi., 338
—— Tumor of the Corneo-Scleral Margin, J. N. Oeller, x., 191 ; xii., 523
DESMARRES, LOUIS AUGUSTE, Biographical Notice of, xi., 517
Diabetic-Cataract, viii., 353
—— Retinitis, ix., 340
Diagrammatic Eye, the New Constants of the, viii., 88
DIMMER, F., Contributions to the Pathological Anatomy of the Choroid, xiv., 60
—— Report of Cases of Congenital Anomalies of the Eye, xiv., 72
Diplocoria, x., 263
Dislocated Lens, Useful Vision in a Case of, x., 422
Dracunculus Doa, ix., 232
Duboisine, W. W. Seely, viii., 79
—— Effect of, upon the Eye, x., 196
—— Poisoning by, xiii., 44
Echinococcus, xii., 516
Ectropion Treated by Transplantation of Flaps without Pedicle, J. Aub, viii., 94
Eczema Simplex Due to Ametropia, S. O. Richey, xiii., 34
Electro-Magnet, An, x., 322
Electro-Therapeutics, General Review of, viii., 424 ; ix., 113, 490 ; x., 117 ; xi., 91
Electrolysis in Ophthalmic Therapeutics, A. Nieden, x., 26
ELY, E. T., Ophthalmoscopic Observations upon the Refraction of the Eyes of Newly-Born Children, ix., 29
Embolism, Literature of, xiv., 298 (Note)
—— Of Retinal Arteries, xi., 397. (See also under Literature of Retina.)
—— Of the Central Retinal Artery, viii., 360
—— Six Cases of Partial, of the Central Artery of the Retina, xiv., 263
Endothelioma, Intra- and Extra-Ocular, Barabascheff, ix., 420
Entropium and Trichiasis, a New Operation for, F. C. Hotz, viii., 249
—— Remarks on, 177
—— Operations for, F. C. Hotz, xi., 442
Enucleation, Death from Tetanus Following, J. J. Chisholm, ix., 48
Episcleritis, Pathology of, xi., 485
Epithelioma, Cases of Melanotic, upon the Front of the Eye—Extirpation of the Tumor, and Preservation of the Globe and of the Sight, H. D. Noyes, viii., 145
Errata, xiii., 296, 555
Erysipelas, a Case of Facial, Followed by Thrombosis of the Retinal Vessels and Blindness, H. Knapp, xiii., 83 ; Appendix to Paper, xiii., 265 ; Bibliography of 35 Cases, xiii., 104
Erythropsia, xiii., 275, 492 ; xiv., 353
Eserine, in Corneal Gangrene, xii., 220
—— On the Therapeutical Use of, in Glaucoma, M. Landesberg, viii., 264
—— Use of, in Kerato-Conus, ix., 192
EVERSBUSCH, O. and PEMERL, J., Report of 1,420 Cataract-Extractions Performed at the University Ophthalmic Hospital, in Munich, from April 1, 1868, to April 1, 1883, xiii., 311
Evisceration of the Globe, E. L. Holmes, xiv., 167
—— Followed by Orbital Cellulitis, H. Knapp, xiv., 309

EWETSKY, VON, Contributions to the Knowledge of the Development of the Eye, viii., 429
Exenteration, xiv., 318
Exophthalmus, Case of Pulsating, x, 330; xii., 185
—— A Case of Pulsating,—Ligation of the Common Carotid,—Death,—David Coggin, xii., 187
—— A Case of Traumatic Pulsating, Cured by Extirpation of the Aneurismal Varix, H. Knapp, xii., 201
—— From Retro-Bulbar Suppuration, viii., 371
—— Its Symptomatic Importance as an Occasional Attendant on Hemorrhagic Forms of Retinitis, Occurring in Connection with Altered and Increased General Arterial Pressure, the Result of Cardiac, Renal, and Hepatic Lesions, Robert Sattler, xiv., 190
—— Without Pulsation, Double, Spontaneous Recovery, Cornelius Williams, xiii., 41
Exostosis, Successful Removal of an Orbital, H. B. Sands, ix., 471
Extraction of Cataract with Peripheral Division of the Capsule, x., 341
Eye, Cases of Injury of the, H. Pagenstecher, viii., 242
—— Contribution, A, to the Anatomy and Pathology of the, J. Hirschberg, viii., 224
—— Contributions to the Knowledge of the Development of the, Von Ewetzky, viii., 429
—— Contributions to the Pathological Anatomy of the Human, A. Alt, viii., 103
—— Injury to the, by Compression with the Thumbs, E. L. Holmes, ix., 182
—— Malignant Tumors of the, x., 55
—— Puerperal Septic Embolism of, ix., 377
—— Wound of, by a Missile from a Cross-Bow — Enucleation — Cyst-Like Collection of Fluid, — D. Webster, xii., 323
Eye and Spinal Cord, xi., 278
Eyeball, Complete Penetration of, by a Piece of Steel, F. C. Hotz, ix., 279
—— Ectopia of, from Osteophytes of the Roof of the Orbit, Alois Birnbacher, xii., 404
—— Rupture of, on its Posterior Hemisphere, from a Blow on the the Face, J. J. Chisholm, xi., 44
Eye Diseases, Relation between, and Those of the Brain, A. Nieden, xii., 365
Eye-Glass Frames, Dangers of, x., 322
Eyelash in the Anterior Chamber, x., 422
Eyelids, Cancer of, x., 46
—— Vaccine Vesicles on, viii., 371
—— Vascular Tumors of the, ix., 338

Fenner, C. S., "Vision and its Defects," Notice, xii., 168
FERNANDEZ, JUAN SANTOS, On the Loss of Sight in Yellow-Fever, x., 440
Fibro-Sarcoma of Right Cerebral Hemisphere, Bilateral Optic Neuritis, xii., 366
Fishes, Dioptrics and Ophthalmology of, xii., 261
Fluorescein, xi., 374
FOERSTER, R., On the Maturity of Cataract, its Artificial Ripening, Corelysis, and Extraction of the Anterior Capsule, xi., 344
Fœtus Cyclope, xiv., 377
Follicular Conjunctivitis, xii., 123
DE FONTENAY, Results of Examinations for Color-Blindness in Denmark, x., 8
FORBES, LITTON, On a New Form of Schematic Eye, x., 256
Foreign Bodies, Action of, in Eye, x., 333; xi., 93
—— in the Background of the Eye, with Preservation of Good Sight, H. Knapp, xi., 222
—— In the Iris, xi., 41
—— In Lens, Removal of, H. Knapp, x., 100
—— Removal of, from the Eye, C. S. Bull, ix., 72
—— Removal of, from Vitreous with Preservation of the Eyeball and Good Perception of Light, J. S. Prout, ix., 197
—— Two Cases of Extraction of, from the Eye, H. Pagenstecher, x., 145
—— Within the Eye, Two Cases of, H. Knapp, viii., 486
—— Cases of, in Eye, J. Hirschberg and E. Vogler, ix., 386
—— Unusual Tolerance of, in Eye, Wheelock Rider, xiii., 264
—— Literature of, xi., 142, 274, 398. (See also under Injuries.)
FRANKE, E., On the Extraction of Cataract according to Jacobson's Method, x., 121

Frontal Sinus, Abscess of the, xiii., 291
—— Contribution to the Pathology of the, H. Knapp, ix., 185
—— Distension of, xi., 263. (See also under Literature of Orbit.)
FUCHS, ERNST, Arterio-Venous Aneurism in the Retina, xii., 32
—— Melanoma of the Iris, xii., 26
FULTON, J. F., A Case of Primary Inflammation of the Lachrymal Gland Occurring Twice in the Same Person, xiv., 161
—— A Case of Severe Orbital Cellulitis, the Result of the Passage of a Bowman's Probe into the Nasal Duct, xiv.; 164
—— A Case of Sympathetic Ophthalmia, Operation on the Exciting Eye, with Restoration of Vision in Both, xiii., 213

Galvano-Cautery in Eye-Diseases, A. Nieden, xiv., 31
—— Second Series of One Hundred Eye Cases Treated with, xiv., 455
GARDINER, E. J., A Case of Persistent Hyaloid Canal and Artery, ix., 473
Glaucoma, Acute, Caused by Homatropina, Frank H. Hodges, xiv., 42
—— Aphorisms, L. Mauthner, viii., 25
—— Colored Rings in, xii., 237
—— Death after a Sclerotomy in, H. Knapp, x., 98
—— Discussion on, x., 340; xi., 489
—— Eserine in, viii., 264
—— Literature of, viii., 278, 517; ix., 241, 492, 504; x., 235, 243, 340, 342, 357; xi., 130, 268, 389, 489; xii., 136, 279; xiii., 271, 489, 537; xiv., 135, 345, 408, 502
—— Peculiar Case of, xii., 281
—— Remarks on the Development of, A. Mooren, xiii., 1
—— Sclerotomy in, ix., 341
Glio-Sarcoma of Pons and Medulla on Right Side, Associated Ocular Paralysis, Neuritis Optica of the Left Eye, Facial Paralysis of the Right Side, Left-Sided Hemiplegia, xii., 371
Glioma, Diagnosis of, xi., 270
—— List of Permanent Recoveries from, xii., 54
—— Mistaken Diagnosis of, xiii., 542
—— Of the Retina, viii., 374; xii., 43
—— With Noteworthy Features, W. C. Ayres, ix., 174
—— Spreading by Metastasis through Many Periosteal Centres, Julian J. Chisholm, xiii., 47
GOLDZIEHER, W., Ossifications in the Eye, ix., 300
Gout, Relation of, to Eye Diseases, xiv., 421
Gowers, W. R., "A Manual and Atlas of Medical Ophthalmoscopy," Notice of, xii., 169
Gray Atrophy of both Optic Nerves, Progressive Paralysis—Three Years Afterwards, Atrophy of the Right Occipital Lobe, xii., 381
GRUENING, EMIL, On the Use of the Actual Cautery in the Treatment of Ulcus Corneæ Serpens, xiv., 28
—— Quinine Amaurosis, with a Case, x., 81
—— The Infusion of Jequirity in Granular Lids and Pannus, xiii., 157
Gun-Cap, Extraction of, from the Posterior Chamber, von Jæger, viii., 397
—— In the Iris for Twenty-Five Years, ix., 286
Gun-Shot Wound of Both Eyes, Absorption of Left Crystalline Lens, Recovery, Fernandes, ix., 85
Gumma, of the Ocular Conjunctiva, xii., 227
—— of the Sclera, xi., 458

HAASE, C. G., A Case of Cysticercus Cellulosæ in the Vitreous, Extraction of the Parasite, Preservation of the Eye and of the Visual Power Present, xii., 64
—— Advancement of the Internal Rectus Muscle, with Tenotomy of the External Rectus, Ulceration of the Cornea with Resultant Panophthalmitis and Atrophy of the Globe, ix., 321
—— Tenotomy of the External Rectus, followed by Orbital Abscess and Atrophy of the Optic Nerve, ix, 317
Hæmophilia, Retinitis from, viii., 359
Handwriting, xii., 484
HANSELL, H. F., A Case of Bi-Temporal Hemianopsia, xiii., 36
HARKNESS, WM., On the Monochromatic Aberration of the Human Eye in Aphakia, xii., 9
Heidelberg Ophthalmological Congress, Report of the 14th Meeting, A. Nieden, xi., 482
Hemeralopia, Review of the Theories of, with a Case of Night-Blindness from Miasmatic Influence, Charles Zimmermann, xii., 190
Hemiachromatopsia, Two Cases of, Henry D. Noyes, xi., 210

Hemianopsia, A Case of Bi-Temporal, H. F. Hansell, xiii., 36
—— Case of Heteronymous, xiii., 497
—— Case of Left-Sided Binocular, E. H. Linnell, x., 446
—— Literature of, viii., 136; ix., 359; xi., 139; xii., 151. (See also under Retina and Functional Anomalies.)
—— Right-Sided, with Neuro-Retinitis Caused by Glio-Sarcoma of the Left Occipital Lobe, L. Jany, xii., 326
—— Superior, A Case of Homonymous, Following Sudden Amaurosis, Theodore Wiethe, xiii., 301
Hemorrhage, Retro-Bulbar, x., 42
HERDEGEN, MORITZ, On the So-Called Concussion of the Retina, x., 399
Herpes Zoster Frontalis, with Neuro-Paralytic Destruction of the Cornea, viii., 351
HEYL, A. G., The New Constants of the Helmholtz Diagrammatic Eye, viii., 88
HILBERT, RICHARD, A New and Convenient Test for Color-Blindness, xiii., 297
—— The Representation of the Limits of the Visual Field, xii., 303
HIRSCHBERG, J., Contributions to the Anatomy and Pathology of the Eye, viii., 224
—— "Der Elektro-Magnet in der Augenheilkunde," Notice of, xiv., 426
—— On Puerperal Septic Embolism, ix., 377
—— On the Extraction of Chips of Iron or Steel from the Interior of the Eye, x,, 369
—— Operative Treatment of Detachment of the Retina, viii., 11
—— Selected Clinical Cases in the Year 1878, viii., 351
—— The Malignant Tumors of the Eye, x,, 55
—— and E. VOGLER, On Foreign Bodies in the Interior of the Eye, with Some Remarks on Optico-Ciliary Neurotomy, ix., 386
Historical Subjects, See Bibliography
HOBBY, C. M., A Case of Quinine Amaurosis Manifesting Itself Primarily in One Eye Only, xi., 33
HOCK, J., Eight Sclerotomies according to Wecker-Mauthner, ix., 329
HODGES, FRANK H., Acute Glaucoma Caused by Homatropina, xiv., 42
HOELTZKE, H., Microphthalmos and Coloboma in a Rabbit, xii., 175
HOLMES, E. L., A Case of Eyelash in the Anterior Chamber, x., 422
—— A Case of Prolapse of the Vitreous through a Needle-Puncture of the Cornea, xiii., 394
—— A Case of Puerperal Retinitis, Blindness, Color-Blindness, Recovery, x., 421
—— A Foreign Body in the Vitreous Removed by Means of a Magnet, xiii., 238
—— A Remarkable Case of Injury of Both Eyeballs, ix., 182
—— An Unusual Opening into the Lachrymal Sac, ix., 184
—— Clinical Contributions, x., 167
—— Evisceration of the Globe, xiv., 167
—— Two Cases of Upward Strabismus, xiii., 392
—— and PARK, ROSWELL, A Case of Severe Injury of the Orbit, xi., 58
Homatropina, A Cause of Acute Glaucoma, xiv., 42
—— Effect of, upon the Eye, x., 196
HORSTMANN, C., Contributions to the Determination of the Refractive Conditions of the Human Eye in the First Five Years of Life, xiv., 45
Hot Baths, Effect of, on Eyes, xi., 90; xiv., 110
HOTZ, F. C., On the So-Called Ptosis-Atonica, Its Nature and Treatment, viii., 400
—— Operation for Entropium and Trichiasis, viii., 249
—— Ophthalmic Miscellanies, ix.. 279
—— Remarks on 177 Operations for Entropium and Trichiasis, xi., 442
—— Serious Effects of Calomel upon the Eye, xi., 49
HOTZ, J. F., Jequirity, xiii., 169
HOWE, LUCIEN, On the Measurement of the Degree of Anæsthesia Produced by Cocaine, xiv., 243
Hyaloid Canal, A Case of Persistent, x., 168
Hyaloid Canal and Artery, A Case of Persistent, E. J. Gardiner, ix., 473
Hydrophthalmos, Three Cases of, Treated with Iridectomy, H. Derby, xi., 37
Hypopyon, xi., 123
Hysterical Amaurosis, xii., 291, 300

Inheritance in Relation to Disease, xi., 93
Injuries, viii., 289; ix., 250, 516; x.,

247, 365 ; xi., 142, 274, 399 ; xii., 156, 295 ; xiii., 283, 499, 547 ; xiv., 145, 360, 417, 511
Injury of Both Eyeballs, ix., 182
Inoculation of Syphilis and Lupus on the Iris and Cornea, xi., 266, 496
Instruments and Remedies, xi., 96, 252, 370, 499 ; xii., 239, 492 ; xiii., 455, 513 ; xiv., 111, 319, 375, 471
Insufficiency, Its Nature, x., 325
Intraocular Growth, Probably Sympathetic, P. H. Mules, viii., 484
Iodoform in Conjunctival Affections, x., 458 ; xii., 124 ; xiii., 483
Iridectomy, Preliminary, in Cataract-Extraction, xiii., 381
—— In Chronic Iritis, xiii., 287
Iridenclesis, Iritis and Glaucoma Following, viii., 497
Irideremia, A Case of Congenital, H. B. Young, xi., 465
Irido-Choroiditis Gummosa, ix., 403
Iridosclerotomy, xiv., 396
Iris, A Case of Foreign Body Retained in the, for Nineteen Years, H. S. Oppenheimer, x., 450
—— Anatomy of, xi., 100
—— Changes in its Tissue in Disease, xiv., 316
—— Cholesteatomatous Cyst of, xi., 129
—— Dangers of Peripheric Prolapse of, xi., 488
—— Coloboma of the, and of the Choroid, Description of an Eyeball Affected with, Da Gamo Pinto, xiii., 216
—— Extraction of Foreign Bodies from the, J. L. Thompson, xi., 41
—— Gun-Cap in the, for Twenty-Five Years, ix., 286
—— Literature of Diseases of, See Uveal Tract
—— Melanoma of the, Ernst Fuchs, xii., 26
—— Morphology and Genesis of Pseudo-Coloboma of the, von Mittelstadt, ix,, 427
—— Pathological Anatomy of Sarcoma of the, J. Thalberg, xiii., 179
—— Peripheric Prolapse of, xi., 488
—— Sarcoma of, x., 140
—— Serous Cyst of, ix., 342
—— Three Cases of the Successful Removal of Sarcoma of, H. Knapp, viii., 82
—— Tuberculosis of the, H. Rueter, xi., 407
Iritis, Iridectomy in Chronic, xiii., 287
—— Recurrent, x., 458 ; xi., 128
Iritis, Salicylate of Sodium in the Treatment of, J. J. Chisholm, ix., 167
—— Serosa, Nature of, ix., 125
—— Syphilitica, Seggel, ix., 342 ; x., 130 ; xii., 133
—— Unusual Forms of, xi., 126
—— and Glaucoma Following Iridenclesis, H. Knapp, viii., 497
Iron and Steel, On the Extraction of Chips of, from the Interior of the Eye, J. Hirschberg, x., 369
Ischæmia of the Retina, ix., 341
Ivory Exostosis, Sub-Periosteal Enucleation of an, H. Knapp, ix., 464

Jaborandi and Pilocarpine in Eye Diseases, Landesberg, M., viii., 118
Jacobson's Method of Cataract-Extraction, x., 121
Von Jaeger, E., A Case of Successful Extraction of a Gun-Cap from the Posterior Chamber of the Eye, viii., 397
Jany, Ludwig, A Case of Right-Sided Hemianopsia and Neuro-Retinitis, Caused by a Glio-Sarcoma in the Left Occipital Lobe, xii., 326
Jequirity, Indications and Contra-Indications of, De Wecker, xiii., 107
—— Hasket Derby, *Ib.*, 115
—— J. J. Chisholm, *Ib.*, 118
—— David Webster, *Ib.*, 121
—— Le Roy Pope Walker, *Ib.*, 131
—— H. Knapp, *Ib.*, 145
—— Emil Gruening, *Ib.*, 157
—— C. J. Kipp, *Ib.*, 164
—— H. W. Williams, *Ib.*, 164
—— George Strawbridge, *Ib.*, 165
—— William F. Norris, *Ib.*, 165
—— W. W. Seely, *Ib.*, 166
—— U. H. Brown, *Ib.*, 168
—— J. F. Hotz, *Ib.*, 169
—— L. De Wecker, *Ib.*, 241
—— H. Knapp, *Ib.*, 247 ; xii., 271, 521 ; xiii., 479, 531 ; xiv., 126, 338, 392, 491
—— As a Cause of Dacryo-Cystoblennorrhœa, xiv., 330
Johnson, Walter B. and Prudden T. Mitchell, Myxosarcoma of the Optic Nerve with Hyaline Degeneration, xiv., 151
Just, O., Contribution to the Statistics of Myopia, x., 23

Keratitis, from Malaria, ix., 341
—— In Lead Workers, xi., 387
Kerato-Conus, Actual Cautery in, x., 233

Kerato-Conus Measurement of, with Javal's Ophthalmometer, S. M. Burnett, xiv., 171
—— Operation for, xii., 130
—— Treatment of, by Eserine, B. Steinheim, ix., 192
Keyser, P. D., Ophthalmological Anomalies, x., 261
—— Sympathetic-Ophthalmia, A Case of Recovery without Operation, and a Case of Peculiar Action, with Recovery after Three Operations, xiv., 12
Kipp, C. J., Jequirity, xiii., 164
—— On a Small Series of Cataract-Extractions and other Operations on the Eye, under Most Unfavorable Hygienic Conditions, ix., 171
Knapp, H., A Case of Paresis of the Ocular Muscles from Coal-Gas Poisoning, viii., 493
—— A Case of Evisceration of the Eyeball Followed by Orbital Cellulitis (Thrombosis)—Recovery, Remarks, xiv., 309
—— A Case of Severe Iritis and Glaucoma Following Iridenclesis, viii., 497
—— A Case of Traumatic Pulsating Exophthalmus, Partially Cured by Ligation of the Common Carotid (Dr. H. B. Sands), Totally Cured by Extirpation of the Aneurisma-Varix of the Orbit, xii., 201
—— A Fragment of Steel Imbedded in the Cornea for Two Years without Causing Irritation, xi., 232
—— A Small Foreign Body in the Posterior Cortex of the Lens Successfully Removed, x., 100
—— Appendix to the Paper on Blindness from Facial Erysipelas, xiii., 265
—— Blindness from Thrombosis of the Retinal Vessels in Facial Erysipelas, xiii., 83
—— Clinical Observations on the Use of Jequirity in Trachoma, xiii., 145, 247
—— Coloring of the Shining Reflex at the Edge of Lenses Dislocated in the Anterior Chamber; a Nice Clinical Experiment, x., 456
—— Contribution to the Pathology of the Frontal Sinuses, ix., 185
—— Foreign Bodies Tolerated in the Background of the Eye with Preservation of Good Sight, xi., 222
—— Further Observations on Optico-Ciliary Neurotomy and Neurectomy, ix., 222
Knapp, H., Nine Successive Cases in Which the Electro-Magnet was Used for the Removal of Fragments of Iron from the Interior of the Eye, xiv., 302
—— On Cocaine and Its Uses in Ophthalmic and General Surgery, xiii., 402
—— On Croup of the Conjunctiva, xi., 1
—— On Quinine Amaurosis with Three Cases, x., 221
—— On the Division of the Optic and Ciliary Nerves, ix., 91
—— Ophthalmoscopic Changes from Concussion of the Retina, ix., 297; x., 102
—— Report and Remarks on a Sixth Hundred of Cataract-Extractions according to Von Graefe's Method, viii., 200
—— Report of a Seventh Hundred of Cataract Operations, with Historical and Critical Remarks, Particularly on the Peripheral Division of the Capsule, x., 295
—— Report of an Eighth Series of One Hundred Consecutive Cataract-Extractions, with Remarks, xii., 69
—— Report of the Heidelberg Ophthalmological Society in 1881, x., 458
—— Report on the Section on Ophthalmology at the International Medical Congress Held in London, 1881, x., 332
—— Sclerotomy for Simple Glaucoma in One Eye, for Hemorrhagic Glaucoma in the Other; Kind Healing in the Former, Panophthalmitis in the Latter—Death, x., 98
—— Sub-Periosteal Enucleation of an Ivory Exostosis of the Frontal Sinus Extending into the Nasal and Orbital Cavities. Healing by First Intention, ix., 464
—— Three Cases of Successful Removal of Sarcoma of the Iris, viii., 82
—— Traumatic Suspension of the Anterior Chamber, Myopia, Restoration of the Anterior Chamber, Acute Glaucoma, Cured with Eserine, x., 451
—— Two Cases of Foreign Bodies within the Eye, viii., 486
—— Two Cases of Removal of Fragments of Iron from the Vitreous, in the One with a Scleral Flap-Section, in the Other with a Magnet, ix., 207

KNIES, MAX, Contributions to the Knowledge of the Diseases of the Uveal Tract, ix., 125
KOLLER, KARL, Original Paper on Cocaine, xiii., 402
KRAUSE, FEDOR, Contributions to the Pathology of Sympathetic Eye Disease, xi., 173
—— On the Anatomical Alterations after Optico-Ciliary Neurotomy, xi., 309
KUBLI, THEODOR, The Clinical Significance of the So-Called Amyloid Tumors of the Conjunctiva, with a Report of Three New Cases, xi., 149

Lachrymal Apparatus, Literature of, viii., 285, 528; ix., 247; x., 363; xi., 113; 262, 380; xii., 112, 262, 511; xiii., 465, 521, 527; xiv., 120, 330, 386, 483
Lachrymal Gland, A Case of Adenoma of, A. Alt, ix., 288
—— A Case of Primary Inflammation of the, Occurring Twice in the Same Person, J. J. Fulton, xiv., 161
—— Mumps of, viii., 369
—— Tumors of the, ix., 345
—— Joseph A. White, xi., 62
—— An Unusual Opening into the, E. L. Holmes, ix., 184
Lachrymal Sac, Congenital Fistula of, Wheelock Rider, xiii,, 263
—— Extirpation of, xi., 114
—— Fistula of, viii., 369
LAKER, CARL, A New Case of Injury to the Eye from a Stroke of Lightning, xiv., 181
LAMBERT, C. ALLEN, The Treatment of Ophthalmia Purulenta Gonorrhoica and Neonatorum, ix., 474
LANDESBERG, M., On the Therapeutical Use of Eserine in Glaucoma, viii., 264
—— On the Therapeutic Use of Jaborandi and Muriate of Pilocarpine in Eye Diseases, viii., 118
—— Sarcoma of Choroid in Children, viii., 345
Landolt, E., "Refraction and Accommodation," Notice, xi., 529
Lamina Cribrosa, Anomalies of, xiv., 475
Lead, Amaurosis from, viii., 363
Lead-Workers' Keratitis, xi, 387
Lens, Becker's Views concerning the, xii., 246, 528
—— Bibliography of Congenital Ectopia of, x., 97
—— Coloring of the Edge of the, when Dislocated into the Anterior Chamber, H. Knapp, x., 456
Lens, Congenital Dislocation of, x., 261
—— Contribution to the Knowledge of the Congenital Displacement of the, D'Oench, x., 89
—— Dislocation of, by Kick of a Horse, xi., 138
—— Foreign Body in Posterior Cortex, Successfully Removed, H. Knapp, x., 100
—— Gliomatous Infiltration of, x., 273
—— Literature of, viii., 279, 520; ix., 244, 509; x., 245, 360; xi., 137, 268, 391, 506; xii., 141, 246, 282, 496; xiii., 274, 491, 516, 549; xiv., 137, 348, 378, 411, 504
—— Natural Opacities of the, xi., 367
—— Ossification within the Capsule of the, x., 275
—— Vortex and Nuclear Arch of the, O. Becker, xii., 169
Lenses, Setting of, Dependent on Muscular Dynamics, xiv., 218
Lids, Amyloid Degeneration of the, xi., 466
—— Cancer of the, Six Cases, x., 46
—— Literature of, viii., 285, 523; ix., 247, 513; x., 246, 363; xi., 111, 261, 378; xii., 108, 245, 260, 509; xiii., 463, 524; xiv., 118, 328, 384, 475, 480
—— Operations on, ix., 116, 494; x,, 120; xiv., 119. (See also Lids, Literature of.)
—— Treatment of Carcinoma of the, xiv., 19
Lightning, Cases of Injury from, xii., 284
—— New Case of Injury to the Eye from a Stroke of, Carl Laker, xiv., 181
—— Injury of the Eye by, H. Pagenstecher, xiii., 26
LINNELL, E. H., A Case of Left-Sided Binocular Hemianopsia, with Report of Autopsy and Microscopical Examination, x., 446
Liquids, Investigations into the Interchange of, in the Eye, by Subcutaneous Injections of Fluorescine, Richard Hilbert, xii., 422
LITTLE, W. S., Experience of a Red-Blind Physician with the Ophthalmoscope, Practical Advantage of Color-Blindness, with a Case, x., 20
LORING, F. B., Modification of the Artificial Leech, viii., 529

Lupus, A Case of, upon the Face, J. J. Chisholm, xi., 234
LYALL, ROBERT W., Biographical Notice of, xi., 517

Magnet, E. Gruening, ix., 349
—— Cases of Extraction of Foreign Bodies from the Eye by the Use of the, Moritz Herdegen, x., 369
—— Extraction of Iron or Steel from the Eye by Means of the, x., 145
—— Literature of Cases of Extraction of Foreign Bodies with the, x., 118, 236, 322; xii., 157. (See also under Injuries and Foreign Bodies.)
—— Nine Successive Cases of Use of, for Removing Pieces of Iron from the Interior of the Eye, H. Knapp, xiv., 302
—— Removal of a Fragment of Steel from the Background of the Eye with the, George T. Stevens, xiv., 196
—— Removal of Foreign Body from Vitreous with, H. Knapp, ix., 207
—— Review of Prof. J. Hirschberg's Monograph on the Use of the, xiv., 426
—— Two Cases of Removal of Steel from the Interior of the Eye by a, J. L. Minor, xii., 40
—— Use of, for Removing Foreign Bodies from the Eye, ix., 491; xiii., 238
Malaria, Eye Diseases from, x., 344
Malarial Keratitis, ix., 341
Malformations of Eye, xii., 244
Manhattan Eye and Ear Hospital, x., 509
MANZ, W., Extirpation of an Osteoma of the Orbit, viii., 320
Massage in Diseases of the Eye, H. Pagenstecher, x., 424
—— J. A. Spalding, x., 435
Masturbation, Eye Diseases from, Hermann Cohn, xi., 428
MAUTHNER, L., Glaucoma-Aphorisms, viii., 25
—— "Sympathetic Diseases of the Eye, Notice," xi., 77
MAYERHAUSEN, G., A New Self-Registering Perimeter, xiv., 54
—— Studies on Chromatokinopsias, xiv., 81
Measles, Followed by Optic Neuritis, ix., 341
"Medical German," a Manual for Physicians, xiii., 295
Melanoma, Intra-Ocular, xi., 197
—— Of the Iris, xii., 26
Melano-Sarcoma, Epi-Scleral, xi., 195
Meningitis, Eye Diseases in, xii., 299
Metal in the Fundus of the Eye with Preservation of Vision, ix., 386
Metalloscopy, ix., 113, 490
Metastatic Carcinoma of Both Eyes, xiii., 270
MINOR, JAMES L., A Case of Gumma of the Ocular Conjunctiva, xii., 228
—— Cases of Trachoma in Negroes, xiii., 400
—— Two Cases of Removal of Steel from the Interior of the Eye by a Magnet, xii., 40
MICHEL, CHARLES E., A Case of Quinine Amaurosis, x., 215
Microphthalmos, viii., 372
—— And Coloboma in a Rabbit, H. Hoeltzke, xii., 175
—— With Microcephalus, E. Pflueger, xiv., 91
Miscellaneous Notes, x., 509; xi., 148, 279, 406, 516; xii., 167, 302, 528; xiii., 170, 294, 543; xiv., 150, 433, 516
VON MITTELSTAEDT, The Morphology and Genesis of Pseudo Coloboma Iridis, ix., 427
MITTENDORF, W. F., "A Manual of Diseases of the Eye and Ear," Notice of, xi., 74
MOOREN, A., Disturbances of Vision and Uterine Diseases, xi., 281
—— Remarks on the Development of Glaucoma, xiii., 1
—— "Twenty-Five Years of Ophthalmic Practice," Notice, xi., 492
Morgagnian Cataract, with Transparent Fluid Cortical, G. A. Nordman, xiv., 258
MULES, P. H., Rare Form of Intra-Ocular Growth, Probably Sympathetic, viii., 484
—— Secondary Septic Ophthalmitis, xiii., 201
Mumps of Lachrymal Gland, viii., 369
Muscles, A Case of Paresis of the Ocular, from Coal-Gas Poisoning, H. Knapp, viii., 493
—— Insufficiency of the Interni, x., 325
—— And Nerves, Literature of Cases, viii., 286, 522; ix., 246, 511; x., 246, 362; xi., 114, 262, 380; xii., 113, 263, 511; xiii., 467, 527; xiv., 121, 330, 386, 484
Mydriasis After Passing a Lachrymal Probe, xiii., 268
Mydriatics, Comparative Value of, x., 323
Myelitis with Double Optic Neuritis, H. D. Noyes, ix., 199

Myopia, xiii., 462
—— Contributions to the Statistics of, O. Just, x., 23
Myopic Eyes, Anatomy of, xii., 107

Negro, Vernal Catarrh of the Conjunctiva in the, S. M. Burnett, x., 414
—— Cases of Trachoma in the, J. L. Minor. xiii., 400
—— Eye Diseases in the, xiii., 187
Narcosis, Deaths from Artificial, xiv., 471
NETTLESHIP, E., On a Rare Form of Primary Opacity (Transverse Calcareous Film) of the Cornea, viii., 293
Neurasthenic Asthenopia, Bibliography of, xii., 480
—— Literature of, xii., 480
—— Wilbrand, xii., 428
Neuritis Optica, in Cerebral Abscess, xiii., 502
—— Retro-Bulbar, xiii., 499; xiv., 44
—— Syphilitica, xiv., 442
Neuro-Retinitis Specifica, viii., 361
New Formations in the Eye, W. C. Ayres, x., 269
Newly Born, Ophthalmoscopic Observations upon the Refraction of the, E. T. Ely. ix., 29
Nicotinic Paralysis of Ocular Muscles, xiii., 468
NIEDEN, A., A New Case of Pulsating Exophthalmus of Both Eyes, xi., 185
—— Contributions to the Study of the Relations between Cerebral and Ocular Diseases, xii., 365
—— Electrolysis in Ophthalmic Therapeutics, x., 26
—— Four Cases of Coloboma of the Sheath of the Optic Nerve, without Additional Fissure of the Uveal Tract, viii., 501
—— Ocular Lesions after Injuries of the Brain and Spinal Marrow, xii., 387
—— On the Use of the Galvano-Cautery in Eye Diseases, Especially in Destructive Processes of the Cornea, xiv., 31
—— Report of the Fourteenth Meeting of the Ophthalmological Congress at Heidelberg, xi., 482
—— Second Hundred Series of One Hundred Cases of Eye Disease, Treated with the Galvano-Cautery, xiv., 455
—— Three Cases of Retro-Bulbar, Pulsating, Vascular Tumor,—Ligation of the Carotid, Recovery, viii., 328
Night-Blindness from Miasmatic Influence, xii., 190
NORDMAN, G. A., A Case of Morgagnian Cataract (Fluid Hypermature), with Transparent Fluid Cortical, xiv., 258
NORRIS, WILLIAM F., Jequirity, xiii., 165
NORTON, GEORGE S., A Case of Abscess of the Brain with Double Optic Neuritis Caries of the Right Orbit and Orbital Cellulitis, xiii., 30
NOYES, H. D., Acute Myelitis with Double Optic Neuritis, ix., 199
—— Case of Melanotic Tumor on the Front of the Eye, Extirpation of the Tumor and Preservation of the Globe and of the Sight, viii., 145
—— "Treatise on Diseases of the Eye," Notice, xi., 74
—— Two Cases of Hemiachromatopsia, xi., 210

Ocular Affections in general Constitutional Diseases, ix., 251, 517; x., 247, 366; xi., 144, 275, 400; xii., 159, 296; xiii., 284, 501, 548; xiv., 147, 362, 419, 512
OELLER, J. N., Contributions to the Study of Chorio-Retinitis Pigmentosa, ix., 1
—— Dermoid Tumor of the Corneo-Scleral Margin, x., 191
D'OENCH, F. E., Contributions to the Knowledge of the Congenital Displacement of the Lens, x., 89
Oil-Cysts of Orbit, viii., 373
OLIVER, CHARLES A., A Description of a Color-Sense Measure, x., 438
—— Preliminary Paper on the Determination of a Standard of Color-Sense for Reflected Color by Daylight, with a Graphic Description of the Individual Limits and Average Results of Sixteen Cases, xi., 65
Opera Glass, On the Adaptation of, to Extremely Myopic Eyes, L. Waldo, viii., 547
Ophthalmia Gonorrhoica and Neonatorum, Treatment of, C. A. Lambert, ix., 474
—— Neonatorum, xii., 121
Ophthalmodynamometer, xiv., 485
Ophthalmological Journals, xi., 87, 148, 247, 363
Ophthalmological Society at Heidelberg, Report of Meeting of, in 1881, H. Knapp, x., 458

Ophthalmometry with the Ophthalmometer of Javal and Schioetz, with an Account of a Case of Kerato-Conus, S. M. Burnett, xiv., 169
Ophthalmoplegia, Unilateralis, viii., 353
—— Universalis Traumatica, viii., 353
Ophthalmoscope in Ametropia, ix., 343
Ophthalmoscopic Examinations in Nervous Diseases, xiv., 105
Ophthalmotrope, A Binocular, W. Browning, x., 249
OPPENHEIMER, H. S., A Case of Foreign Body Retained in the Iris for Nineteen Years, x., 450
Optic and Ciliary Nerves, On the Division of the, H. Knapp, ix., 91
Optic Chiasma, xi., 504
Optic Disc, A Case of Congenital Deformity of the, Theodore Wiethe, xi., 70
Optic Nerve, A Peculiar Anomaly of, D. O. Purtscher, xii., 419
—— Anatomy of, xiii., 517
—— Case of Commotion of, xiv., 98
—— Hereditary Atrophy of the, xiii., 289
—— Myxo-Sarcoma of, with Hyaline Degeneration, Walter B. Johnson and T. Mitchell Prudden, xiv., 152
—— On Resection of the, C. Schweigger, xiv., 223
—— On Resection of, in Sympathetic Ophthalmia, xi., 199
—— Stationary Atrophy of, viii., 364
—— Tumors of, xii., 294
—— And Retina, Literature of, viii., 280, 516, 517; ix., 241, 505, 507; x., 245, 357, 360; xi., 139, 141, 257, 270, 273, 374, 393, 397, 503; xii., 145, 152, 248, 256, 287, 292, 498, 500; xiii., 278, 281, 457, 459, 494, 498, 516, 522, 543; xiv., 140, 144, 322, 323, 353, 357, 379, 414, 474, 501
Optic Neuritis, A Case of, Accompanied with Obscure Nervous Symptoms, J. J. Chisholm, xi., 239
—— After Measles, ix., 341
—— Double, in Tubercle of the Pons, viii., 224
—— In Myelitis, ix., 199
—— Sudden Blindness under the Picture of, xiii., 289
—— And Intra-Cranial Disease, x., 338
Optic Thalami, Function of, xii., 450
Optico-Ciliary Neurotomy, J. Hirschberg and E. Vogler, ix., 386; ix., 91, 494; x., 119, 330
Optico-Ciliary Neurotomy, Failures after, ix., 394
—— Further Observations on, H. Knapp, ix., 222
—— On the Anatomical Alterations after, F. Krause, xi., 309
Orbit, A Case of Severe Injury of the, E. L. Holmes and Roswell Park, xi., 59
—— A Compound Dermoid Cyst of the, Henry G. Cornwell, xi., 338
—— Aneurismal Tumor of, x., 167
—— Cystic Tumor of, Removed by Electrolysis, with Restoration of Vision, J. L. Thompson, xii., 183
—— Exostosis of, ix., 471
—— Extirpation of an Osteoma from, W. Manz, viii. 320
—— Literature of Cases, viii., 286, 524; ix., 247, 514; x., 247, 363; xi., 116, 263, 382; xii., 116, 264, 514, 528; xiv., 122, 331, 387, 486
—— Oil-Cysts of, viii., 373
—— Osteophytes of the, xii., 404
Orbital Abscess, Following Unsuccessful Extraction of a Canine Tooth, xiv., 177
Orbital Cellulitis, A Case of, the Result of the Passage of a Bowman's Probe into the Nasal Duct, John F. Fulton, xiv., 164
—— Contributions to the Etiology and Treatment of, H. Pagenstecher, xiii., 17
—— Following Evisceration, xiv., 309
—— From Carious Teeth, xiii., 17
—— From Syphilitic Periostitis, xiii., 21
Ossification in Eye, ix., 232
—— Goldzeiher, ix., 300
—— Within the Lens Capsule, x., 275
Osteoma of Orbit, viii., 320

PAGENSTECHER, H., Cases of Injury of the Eye, viii., 242
—— Contributions to the Etiology and Treatment of Orbital Cellulitis, xiii., 17
—— Injury of the Eye by Lightning, xiii., 26
—— Massage in the Diseases of the Eye, x., 424
—— On the Extraction of Cataract in its Capsule, with a Report of One Hundred and Seventeen Recent Cases, x., 152
—— Ophthalmoscopic Appearances after Retro-Ocular Hemorrhages, xiii., 22
—— Two Cases of Extraction of

Splinters of Iron from the Vitreous, with Observations on the Diagnosis and Extraction of Steel and Iron Particles by Means of the Magnet, x., 145
Parlysis, Internal Ocular, xiv., 366
Parasites, Reports of Cases of, ix,, 250, 516; x., 366; xi., 95, 142, 274; xiii., 283, 499 (see also Injuries)
Pathology, Reviews of, viii., 277, 414; ix., 98, 237, 497; x., 239, 352; xi., 90, 251, 366, 495; xii., 235, 496; xiii., 453, 510; xiv., 108, 316, 373, 469
Penmanship, Discussion on, xi., 487
—— On the Oblique System of, xi., 487
Perimeter, A New Self-Registering, G. Mayerhausen, xiv., 54
—— A Registering, x., 232
Periostitis of the Walls of the Orbit, ix., 285
PFLUEGER, E., A Case of Microcephalus with Microphthalmus, xiv., 91
—— Metastatic Sarcoma of the Choroid, xiv., 185
—— Observations on Color-Blindness, ix., 435
Physiology, Literature of, viii., 129, 416; ix., 101, 361; x., 109; xi., 102, 255, 372, 508; xii., 253, 499; xiii., 453, 521; xiv., 114, 322, 380, 476
Pilocarpine in Eye Diseases, M. Landesberg, viii., 118
Plateau-Oppel Phenomenon, xi., 104
POOLEY, THOMAS R., On the Detection of the Presence and Location of Steel and Iron Foreign Bodies in the Eye by the Indications of a Magnetic Needle, ix., 219, 255
Posterior Chamber, Extraction of Gun-Cap from, viii., 397
Pregnancy, Retinitis in, x., 421
PRINCE, A. E., An Accidental Divulsion of a Pterygium Leading to an Improvement in the Regular Operation, xiv., 16
PROUT, J. S., Removal of a Piece of Steel from the Vitreous, Preservation of the Eyeball, and Good Perception of Light, ix., 197
—— And BULL, C. S., Sarcoma of the Choroid, Ciliary Body, and Iris, x., 140
—— Sarcoma of the Tarsus and Conjunctiva of the Lid, with Amyloid Infiltration, viii., 73
Pterygium, A New Operation for, A. E. Prince, xiv., 16
Ptosis, de Wecker's Operation for, xii., 110
—— Atonica, Its Nature and Treatment, F. C. Hotz, viii., 400
Puerperal Septic Embolism of the Eye, J. Hirschberg, ix., 377
Pulsating Exophthalmus, x., 330
Puncta Lachrymalia, Epiphora from Congenital Atresia of the, Successfully Relieved by Operation, S. M. Burnett, xiii., 53
Pupil, Condition of the, in Tabes Dorsalis, xii., 350
—— In Sleep, viii., 137
—— Movements of, xiv., 325
—— Nerves of, xiii., 457; xiv., 477
Pupillary Membrane, Persistent, xiv., 500
PURTSCHER, D. O., A Peculiar Anomaly of the Optic Nerve, xii., 419
—— Investigations on Cancer of the Eyelids, x., 46

Quinina, Amaurosis from, ix., 41; x., 327, 461
—— Cases of, E. Gruening, x., 81; H. Knapp, x., 221; C. E. Mitchell, x., 215
—— In One Eye Chiefly, C. M. Hobby, x., 233
Quinine Poisoning, A Case of Amblyopia from, Roosa and Ely, ix., 81

RAEHLMANN, E. F., Amyloid Degeneration of the Conjunctiva, x., 171
—— Of the Eyelids, xi., 466
Rectus, Advancement of, Followed by Panophthalmitis, and Atrophy of the Globe, C. G. Haase, ix., 321
—— Tenotomy of, Followed by Orbital Abscess and Atrophy of the Optic Nerve, ix., 317
Red-Blind, Those Who Are, Should Learn the Art of Engraving, x., 20
Red-Blindness, an Advantage with the Ophthalmoscope, W. S. Little, x., 20
Refraction, and Basal-Line in Girls from Five to Eighteen Years of Age, Otto Beselin, xiv., 200
—— Determination of, in the Inverted Image, xi., 103
Refractive Conditions of the Human Eye during the First Five Years of Life, C. Horstmann, xiv., 45
Reports on the Progress of Ophthalmology, viii., 127, 277, 413, 514; ix., 96, 237, 357, 486; x., 108, 239, 352, 463; xi., 79, 243, 360, 490; xii.,

105, 231, 484 ; xiii., 267, 449 ; xiv., 103, 313, 467
Retina, A Case of Pseudo-Cyst of, Reuling, ix., 45
—— Anæsthesia of the, xii., 428
—— Arterio-Venous Aneurism in the, Ernst Fuchs, xii., 32
—— Blinding of, xii., 290
—— Contributions to the Pathology of Hemorrhages of the, J. Thalberg, xiii., 173
—— Detachment of, xi., 394
—— Detachment of, Simulating Intra-Ocular Tumor, D. Webster, ix., 276
—— Embolism of Artery in the, Recovery by a Cilio-Retinal Anastomosis, x., 460
—— Genesis of Detachment of, xi., 483
—— Glioma of the, with a Bibliography of Cases from 1869 to 1878, Vogler, viii., 374
—— Glioma of the, ix., 174
—— Hemorrhage, Primary, in Youths, x., 338
—— Histogenesis of the, xi., 101
—— Ischæmia of the, ix., 341
—— Literature of (See Optic Nerve)
—— Observations on Detachment of the, C. Schweigger, xi., 451
—— On the so-called Concussion of the, Moritz Herdegen, x., 399
—— Operation for Detachment of, xiv., 508
—— Operative Treatment of Detachment of, J. Hirschberg, viii., 11
—— Ophthalmoscopic Changes in Concussion of the, H. Knapp, ix., 297 ; x., 102
—— Partial Embolism of the Central Artery of the, and of its Branches, Schnabel, and Theodore Sachs, xiv., 263
—— Peculiar Circulation in the Arteries and Veins of the, P. A. Callan, x., 138
—— Physiology of, xiii., 459
—— Primary Hemorrhage from, xi., 395
—— Spontaneous Disappearance of Detachment of, xi., 454
—— Thrombosis of Vessels of the, Followed by Blindness, H. Knapp, xiii., 83
—— Twenty-four New Cases of Glioma of the, U. Vetsch, xii., 43
Retinitis, a Case of Puerperal, E. L. Holmes, x., 421
—— Albuminurica Unilateralis, xiii., 279 ; xiv., 367
Retinitis, Diabetica, ix., 340
—— From Hæmophilia, viii., 359
—— Hyperplastica, xi., 140
—— Pigmentosa, viii., 228
—— Anatomy of, xiv., 415
—— Unilateral, xii., 148
—— Punctata Albescens, S. M. Burnett, xii., 22 ; xiii., 495
—— Various forms of, xii., 288
Retro-Bulbar Hemorrhage, S. C. Ayres, x., 42
—— Neuritis, Anatomy of, xii., 155
—— Suppuration, Spontaneous Cure of, viii., 372
—— Tumor, Ligation of the Carotid—Recovery, A. Nieden, viii., 328
Retro-Ocular Hemorrhage, Ophthalmoscopic Appearances after, Pagenstecher, xiii., 22
REULING, G. A., A Case of Pseudo-Cyst of the Retina Enclosing a Foreign Body, ix., 45
REUTER, H., Tuberculosis of the Iris, xi., 407
Rheumatic Irido-Choroiditis with Gelatinous Exudation, ix., 281
Ribbon-Shaped Keratitis, xii., 524
RICHEY, S. O., Eczema Simplex, from Ametropia, xiii., 34
RIDER, WHEELOCK, A Case of Congenital Fistula Sacci Lachrymalis, xiii., 263
—— An Unusual Tolerance of a Foreign Body in the Fundus of the Eye, xiii., 264
Ring Scotoma in Specific Retinitis, viii., 363
ROEDER, W., On the Common Causes of Glaucoma, Myopia, Astigmatism, and the Majority of Cataracts, ix., 324
ROOSA, ST. JOHN, A Case of Poisoning from the Use of the Compound Tincture of Cinchona, Producing Permanent Contraction of the Visual Fields and Temporary Impairment of the Sight and Hearing, viii., 392
—— and ELY, E. T., A Case of Supposed Amblyopia from Quinine Poisoning, ix., 81
—— Clinical Contributions, ix., 41
Round Worm, Migration of, into Lachrymal Canal, x., 247

Salicylates in Iritis, ix., 167
SANDS, H. B., Successful Removal of an Orbital Exostosis, ix., 471
Santonine, xii., 503
SANTOS-FERNANDES, J., Gun-Shot

Wound of Both Eyes, Absorption of Left Crystalline Lens—Recovery, ix., 85
Sarcoma, Binocular Metastatic, of Choroid, xii., 278
—— Epi-Ocular, xi., 190
—— Extra-Ocular, xi., 192
—— Of Choroid, viii., 372; x., 140, 269, 325
—— Of Choroid in Children, viii., 345
—— Of Choroid, Ciliary Body, and Iris, J. S. Prout and C. S. Bull, x., 140
—— of Conjunctiva, with Amyloid Infiltration, viii., 73; x., 345
—— Primary, of Iris, xiii., 179
—— Removal of, from Iris, viii., 82
SATTLER, ROBERT, Exophthalmus, xiv., 190
—— On Trachoma, xii., 269; xiii., 477
—— The Treatment of Superficial and Infiltrating Varieties of Pavement Epithelial Carcinoma of the Eyelids, xiv., 19
SCHAEFER, HERMANN, Comparative Investigations into the Effect upon the Eye of Atropina, Duboisina, and Homatropina. x., 196
Schell, H. S., "A Manual of Ophthalmic Practice," Notice, xi., 74
Schematic Eye, On a New Form of, Litton-Forbes, x., 256
Schischm Seeds, xiv., 321
SCHMEICHLER, LUDWIG, The Eye-Disturbances in Tabes Dorsalis, xii., 335
SCHMIDT-RIMPLER, Antiseptic Action of Cocaine, Corrosive Sublimate, and Chlorine Water upon Dacryocystatic Secretions, Tested by Inoculations of the Cornea, xiv., 447
SCHNABEL and SACHS, THEODORE, Partial Embolism of the Arteria Centralis Retinæ, and of its Branches, xiv., 263
School-Children, Eyes of, xi., 245
—— Weak Eyes of, x., 349
SCHWEIGGER, C., Cases from Practice, xiv., 98
—— Observations on Detachment of the Retina, xi., 451
—— On Re-Section of the Optic Nerve, xiv., 223
Sclera, Literature of, See Conjunctiva
—— Syphilitic Gumma of the, J. A. Andrews, xi., 458
Sclerotomy, J. Hock, ix., 329, 341
—— Death Following, in a Case of Hemorrhagic Glaucoma, x., 98
Sclerotomy, Panophthalmitis Following, in a Case of Glaucoma, x., 98
Scopolia Japonica, xiv., 473
Scotoma, Central Hereditary, viii., 360
—— (Ring) In Specific Retinitis, viii., 363
Secondary Septic Ophthalmitis, P. H. Mules, xiii., 201
SEELY, W. W., On the Use of Duboisine, viii., 79
—— Jequirity, xiii., 166
Seggel, Irido-Choroiditis Gummosa and the Frequency of Syphilitic Iritis Generally, ix., 403
Sight, Impairment of, from a Poisonous Dose of Compound Tincture of Cinchona, viii., 392
Simulation of Amaurosis, viii., 519; xi., 405
Sixth and Seventh Pairs of Nerves, Congenital Paralysis of the, J. J. Chisholm, xi., 323
Skull, Blindness after Fracture of the Base of the, xi., 335
SPALDING, J. A., A Case of Intra-Cranial Tumor, with Symptoms Chiefly on the Part of the Eyes, ix., 160
—— Massage in Diseases of the Eye, x., 434
Sphenoidal Cavities, Tumors of, Implicating Vision, J. J. Chisholm, xi., 53
Spring Conjunctivitis, Boro-Glyceride in, xiii., 60
—— (Note) In the Negro, x., 414
—— Pathology of, xi., 485
Staphyloma Posticum, xii., 136
Statistical Papers, viii., 426, 520; ix., 114, 235, 492; x., 464; xi., 84, 246, 361, 492; xii., 142, 233, 286, 488; xiii., 311, 450, 493, 510; xiv., 106, 138, 314, 371, 468
Steel and Iron in the Eye, Detection of, by a Magnetic Needle, T. R. Pooley, ix., 219, 255
STEINHEIM, B., Contribution to the Treatment of Kerato-Conus by Eserine, ix., 192
STEVENS, GEORGE T., A Fragment of Steel Removed from the Background of the Eye with the Electro-Magnet, xiv., 196
STILLING, J., The Present Aspect of the Color Question, viii., 164
Strabismus, Two Cases of Upward, xiii., 392
STRAWBRIDGE, GEORGE, Jequirity, xiii., 165
Strychnina in Eye Diseases, xii., 294

Sublimate, xiii., 515; xiv., 391
—— Antiseptic Action of, xiv., 447
Symblepharon, an Improved Method of Operating in, A. Alt, ix., 293
Sympathetic, Glaucoma, xiii., 271
—— Irido-Cyclitis, without Prodromal Symptoms, viii., 231
—— Ophthalmia, after Cataract-Extraction, ix., 337; xi., 391; xiii., 390
—— After Surgical Operations on the Eye, J. J. Chisholm, x., 265
—— Cases of Secondary Septic Ophthalmitis, P. H. Mules, xiii., 201
—— Cases of Recovery from, J. Hirschberg, viii., 237
—— After Poulticing, xi., 201
—— After Re-Section of the Optic Nerve, S. C. Ayres, xi., 199
—— With and without Operations, P. D. Keyser, xiv., 12
—— Caused by Symblepharon, x., 237
—— Contributions to the Pathology of, W. C. Ayres, x., 277; Fedor Krause, xi., 173
—— Discussion on, x., 336
—— Operation on the Exciting Eye, with Recovery of Vision in Both, J. F. Fulton, xiii., 213
—— Pathogeny of, xiv., 410
—— Recent Theories of the Pathogeny of, from a Microscopic Standpoint, Samuel Theobald, xiii., 62
—— Various Reports on and Literature concerning, ix., 503; x., 243, 357; xi., 134, 268, 391; xii., 139, 282; xiii., 273, 491, 538; xiv., 135, 347, 409, 503
Synchisis, a Case of Sparkling, Kerato-Iritis, Poisoning by Duboisia, F. M. Wilson, xiii., 44
—— Scintillans, David Webster, xii., 179
Syphilitic Iritis, Seggel, ix., 403; xi., 130
—— With Gelatinous Exudation, ix., 283

Tabes, Bibliography of the Eye-Symptoms in, xii., 363
—— Eye Disturbances in, L. Smeichler, xii., 335
Tarsus, Sarcoma of, with Amyloid Infiltration, viii., 73
Teeth, Diseases of, Associated with Eye Diseases, xiii., 202 (Note)
—— Orbital Cellulitis from Carious, xiii., 7
—— Orbital Cellulitis from Diseased, xiii., 18
Temporal Bone, Perforating Wound of, Paralysis of the Left Abducens Nerve, Right-Sided Hemiplegia without Loss of Sensibility, Sensory Aphasia, xii., 394
Tenonitis in Diphtheria, ix., 351
Tenotomy of External Rectus, Followed by Orbital Abscess and Atrophy of the Optic Nerve, C. G. Haase, ix., 317
Text-Books on Ophthalmology, (Wolfe, Gowers, Benner), xii., 168
THALBERG, J., Contributions to the Pathological Anatomy of Retinal Hemorrhages, xiii., 173
—— On Corneal Gangrene Caused by Inanition, xii., 211
—— On the Pathological Anatomy of Congenital Coloboma of the Choroid and Iris, xiii., 253
—— The Pathological Anatomy of Primary Sarcoma of the Iris, xiii., 179
THEOBALD, SAMUEL, A New Eye Bandage, ix., 154
—— Some Recent Theories Regarding the Pathogeny of Sympathetic Ophthalmia, xiii., 62
Therapeutics, Literature of, viii., 138, 422; ix., 110, 486; x., 115; xi., 90, 250, 366, 497; xii., 238, 490; xiii., 454, 511; xiv., 109, 317, 374, 470
Third Nerve, Double Paralysis of, xi., 115
THOMPSON, J. L., Cystic Tumor of the Orbit Removed by Electrolysis, Restoration of Vision, xii. 183
—— Extraction of Foreign Bodies from the Iris, xi., 41
Tonic Blepharospasm, Relieved by Tincture of Iodine, ix., 283
Tooth, Attempted Extraction of a Canine, Followed by Orbital Abscess, Total Blindness, Atrophy of the Disc and Obliteration of the Retinal Vessels, S. M. Burnett, xiv., 177. (See Teeth.)
Total Amaurosis from Concussion, ix., 43
Trachoma, Micrococci of, xi., 484
—— Pathology of, x., 459
—— Sattler's Views concerning, x., 459; xi., 484
Trachomatous Conjunctivitis, Boroglyceride in, xiii., 57
Trichiasis, Operation for, F. C. Hotz, xi., 442
Tubercle, of Iris, Bibliography of, xi., 407
—— Of Pons, with Optic Neuritis, viii., 224

Tubercle, various Forms and Locations of, in the Eye, xii., 315
Tuberculosis of Eye, ix., 498; xi., 407; xiii., 278; xiv., 133
—— Literature of, xi., 426
Tumor, Case of Intra-Cranial, J. A. Spalding, ix., 160
—— Literature of, viii., 287, 524; ix., 248, 515. (See also Orbit.)
—— Of the Eye, Adamuek, xi., 190
—— Of the Eye and Increased Tension, xi., 130
—— Malignant, of the Eye, J. Hirschberg, x., 55
—— Retrobulbar, Recovery after Ligation of Carotid, viii., 328
TURNBULL, CHARLES, Boroglyceride in the Treatment of Conjunctivitis Trachomatosa (Arlt), Ophthalmia Contagiosa of Asylums, xiii., 57

ULRICH, RICHARD, Investigations on the Interchange of Liquids in the Eye, by Means of Subcutaneous Injections of Fluorescine, xii., 422
Uterine Diseases and Disturbances of Vision, A. Mooren, xi., 281
Uveal Tract, Contributions to the Knowledge of the Diseases of the, Max Knies, ix., 125
—— Literature of, viii., 277, 416, 515; ix., 239; x., 242, 356; xi., 126, 266, 388; xii., 131, 255, 276; xiii., 267, 489, 535; xiv., 133, 324, 342, 378, 405, 477, 510

Vaccine Vesicles on the Eyelids, viii., 371
Venous Pulsation of the Retina, xi., 486
Vernal Catarrh of Conjunctiva, x., 414
Vertigo, Ocular, xi., 275
Vesicles of Conjunctiva, xiv., 100
VETSCH, U., Glioma of the Retina, Twenty-four New Cases of, xii., 43
Vision, Acuteness of, by Day-, Gas-, and Electric Light, Cohn, ix., 51
Visual Field, Representation of the Limits of, R. Hilbert, xii., 303
—— Contraction of, Produced by a Poisonous Dose of the Compound Tincture of Cinchona, St. John Roosa, viii., 392
Visual Purple, Physiology of, x., 238
Visual Tests by Dots, xiii., 455
Vitreous, Circumscribed Abscess of, ix., 393
—— Cysticercus Cellulosæ in the, xii., 64
—— Foreign Body in the, Removed by Means of a Magnet, E. L. Holmes, xiii., 238
Vitreous, Literature of, viii., 519; ix., 244, 509; x., 360; xi., 270, 393, xii., 144, 246, 496; xiii., 277, 516, 542; xiv., 140, 353, 378, 416, 506
—— Prolapse of, Through a Needle-Puncture of the Cornea, E. L. Holmes, xiii., 394
—— Recurrent Idiopathic Hemorrhages into the, xi., 482
—— Removal of Foreign Bodies from, xiii., 292
—— Two Cases of Removal of Foreign Bodies from, H. Knapp, ix., 207
VOGLER, E., A Case of Cysticercus Intra-Ocularis, ix., 272
—— Contributions from Dr. Hirschberg's Eye-Clinic, viii., 374

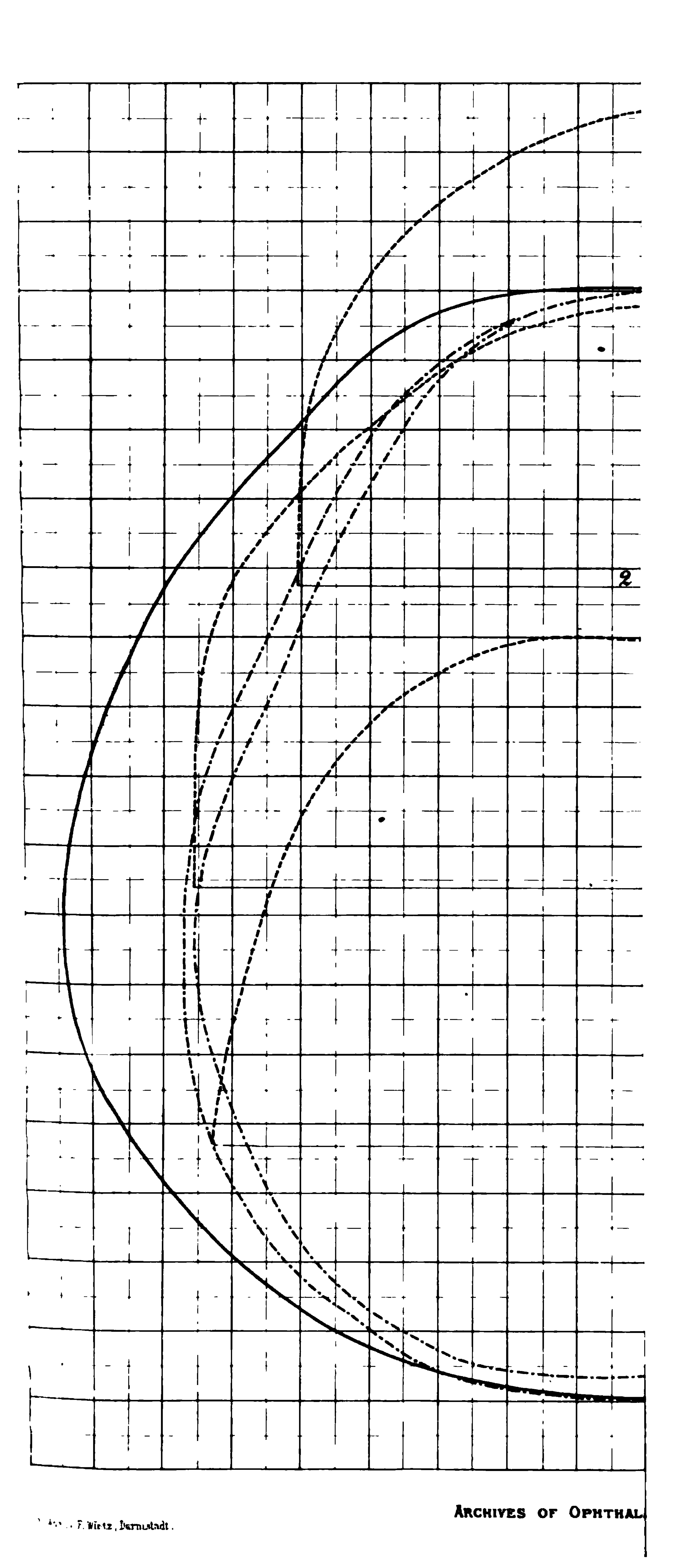
WALDO, L., Note on the Adaptation of the Opera-Glass to Extremely Myopic Eyes, viii., 547
WALKER, LE ROY POPE, Jequirity (Abrus Precatorius) in the Treatment of Granular Lids, xiii., 131
WEBSTER, DAVID, A Remarkable Case of Detachment of the Retina, with Hemorrhage into the Vitreous, Simulating Intra-Ocular Tumor, ix., 276
—— Experience with Jequirity at the Manhattan Eye and Ear Hospital, xiii., 121
—— Synchisis Scintillans, xii., 179
—— Wound of an Eye by a Missile from a Cross-bow, Enucleation for Sympathetic Irritation, Remarkable Lesion of the Iris, Cyst-like Collection of Fluid, xii., 323
WHITE, JOSEPH A., Tumor of Lachrymal Gland, xi., 62
White and Colored Races in the United States, Comparative Frequency of Eye Diseases in the, S. M. Burnett, xiii., 187
Wickersheimer's Preserving Fluid, ix., 348
WIETHE, THEODORE, A Case of Congenital Deformity of the Optic Disc, xi., 70
—— A Case of Sudden Amaurosis Followed by Homonymous Superior Hemianopsia, xiii., 301
WILLIAMS, CORNELIUS, A Case of Amblyopia from Menstrual Hemorrhage in Typhoid Fever, Recovery of Sight, xiii., 397
—— A Case of Exophthalmus Affecting Both Eyes, without Pulsation,

Episcleritis—Spontaneous Recovey, xiii., 41
Williams, H. W., Jequirity, xiii., 164
—— "Text-Book on Ophthalmology," Notice, xi., 74
Wilbrand, Hermann, Neurasthenic Asthenopia and the So-Called Anæsthesia of the Retina, xii., 428
Wilson, F. M., A Case of Sparkling Synchisis, Kerato-Iritis, and Poisoning by Sulphate of Duboisia, xiii., 44
Wolfe, J. R., "On Diseases and Injuries of the Eye," Notice of, xii., 167

Xerophthalmia, xiii., 485

Yellow-Fever, On the Loss of Sight in, J. S. Fernandez, x., 440
Yellow-Spot, Circulation of the Blood at the, W. C. Ayres, xi., 476
Young, H. B., A Case of Congenital Irideremia, xi., 465

Zimmerman, Charles, A Review of the Theories of Hemeralopia, with a Case of Night-Blindness from Miasmatic Influences, Affecting Four Children of the Same Family, xii., 190
Zone of Zinn, xiv., 474
Zonula, Abnormal Tightness of, As a Cause of Glaucoma, Myopia, Astigmatism, and Most Cataracts, Roeder, ix., 324



Anst. v. F. Wirtz, Darmstadt.

Tab. II.

Fig 1

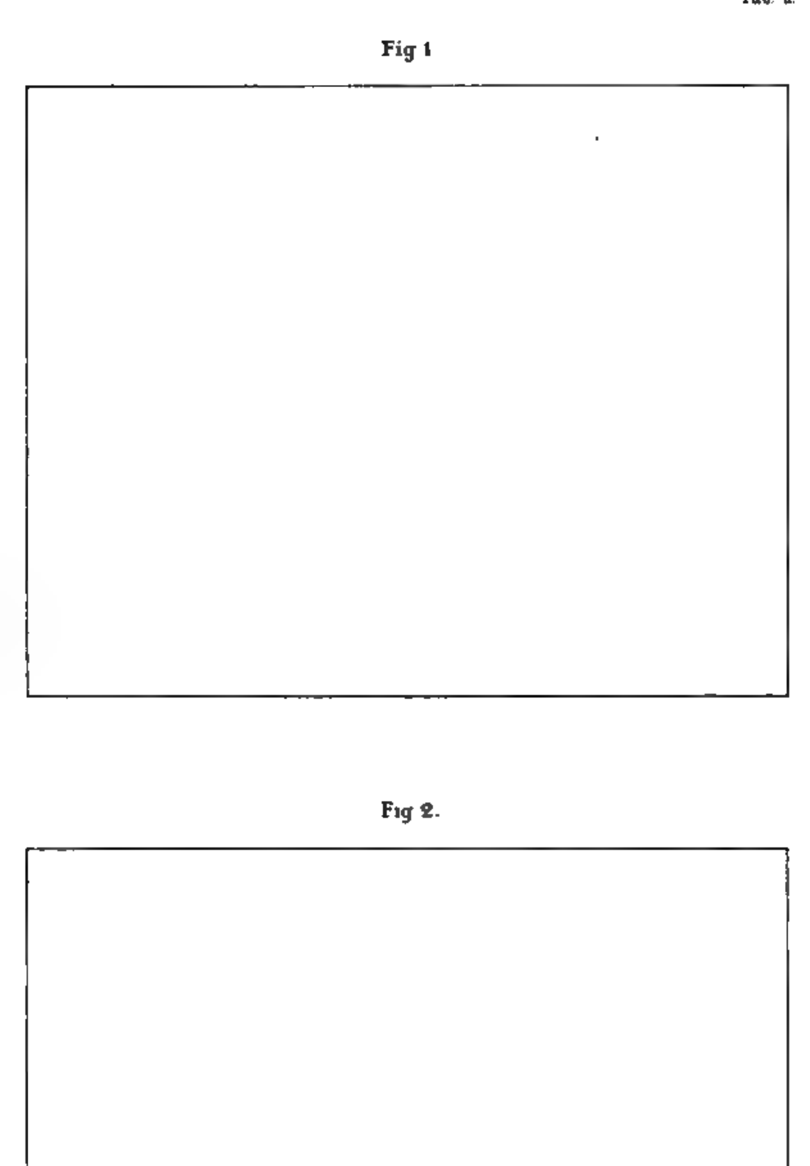


Fig 2.

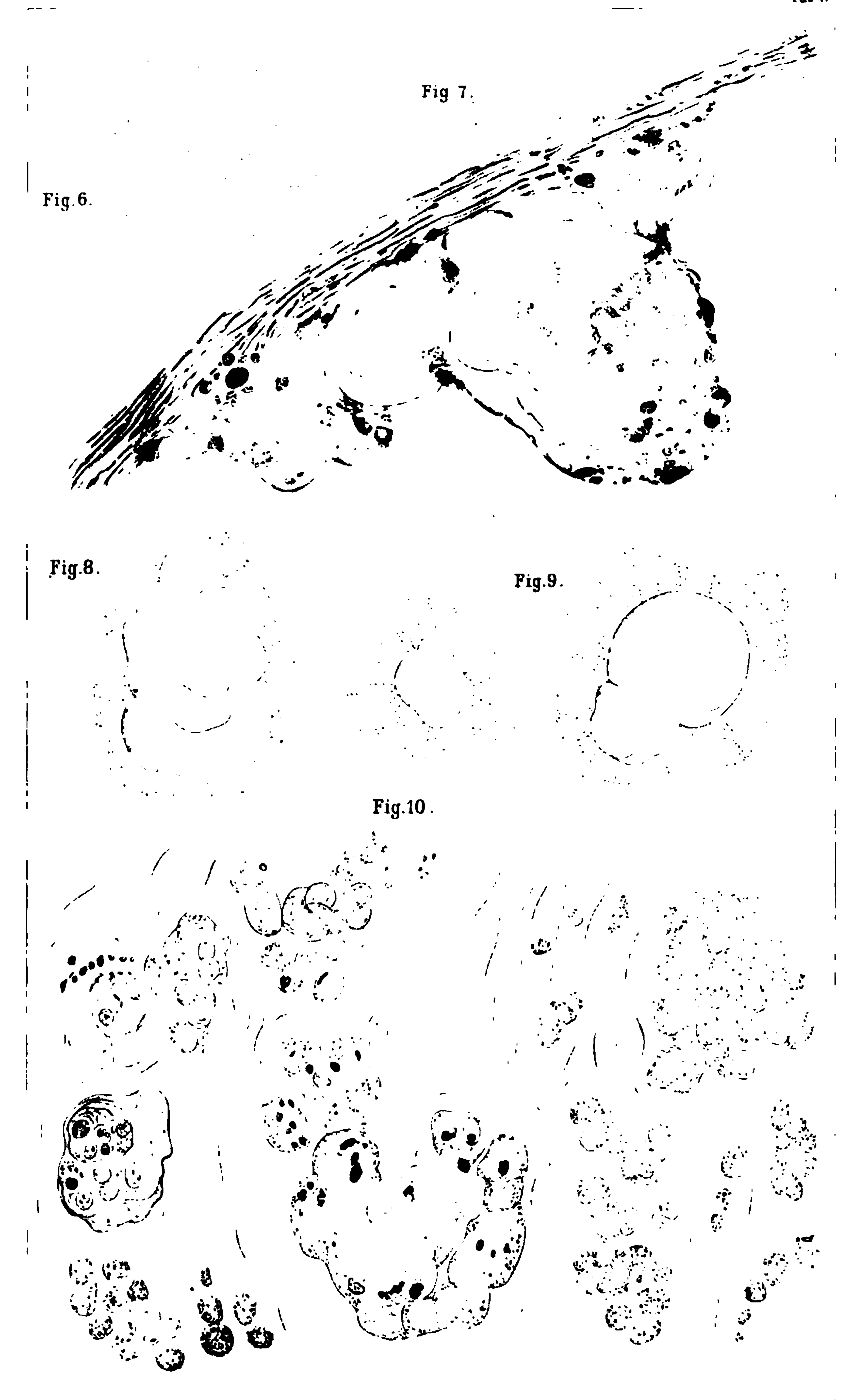
Lith Anst v Werner & Winter, Frankfurt a/M.

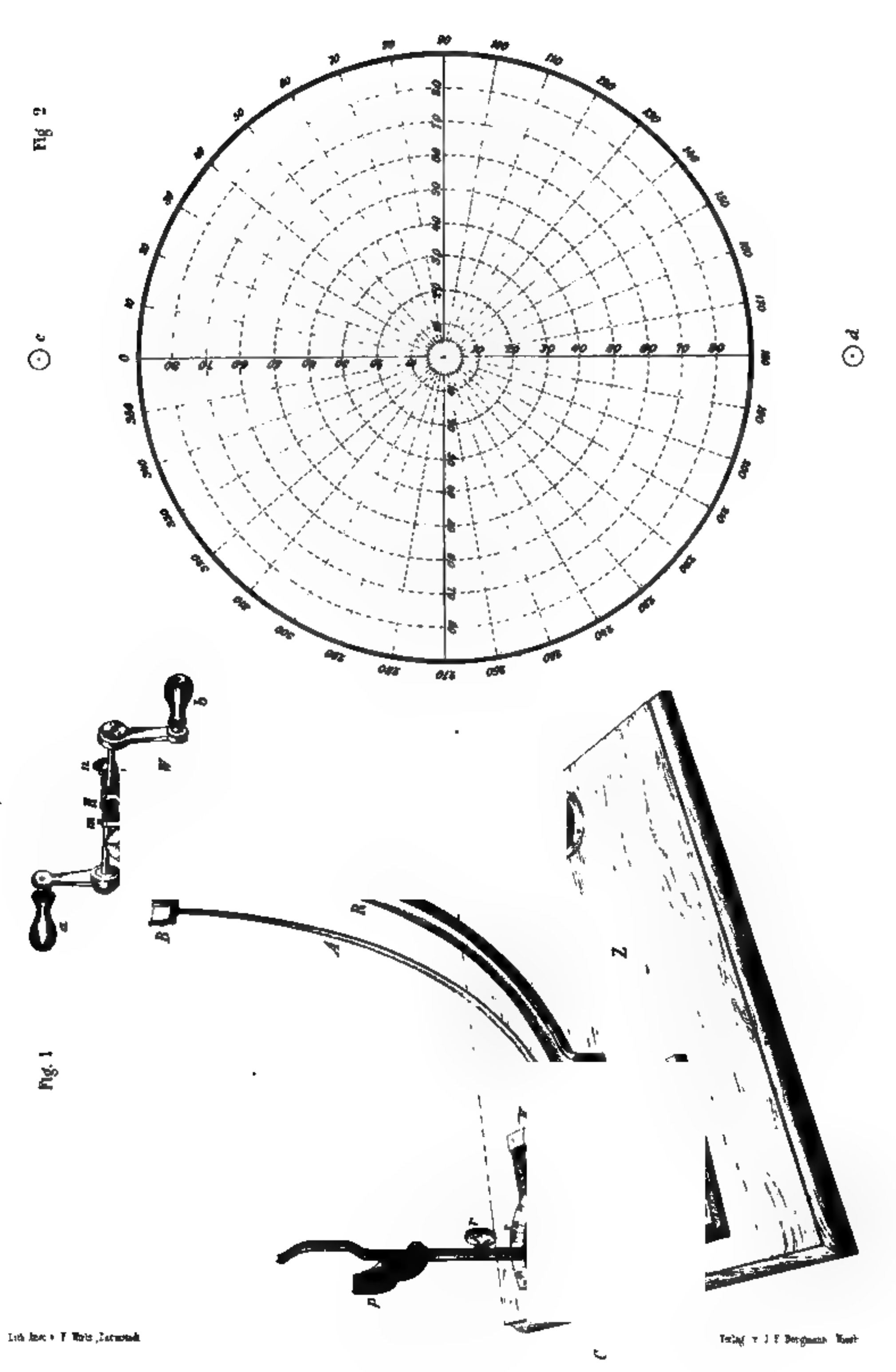
Fig

Fig 4

Fig 3

Fig 5


Fig 7.
Fig. 6.
Fig. 8.
Fig. 9.
Fig. 10.



Lith Anst. v. F. Wirtz, Darmstadt

Verlag v. J. F. Bergmann, Wiesb.

Fig 1

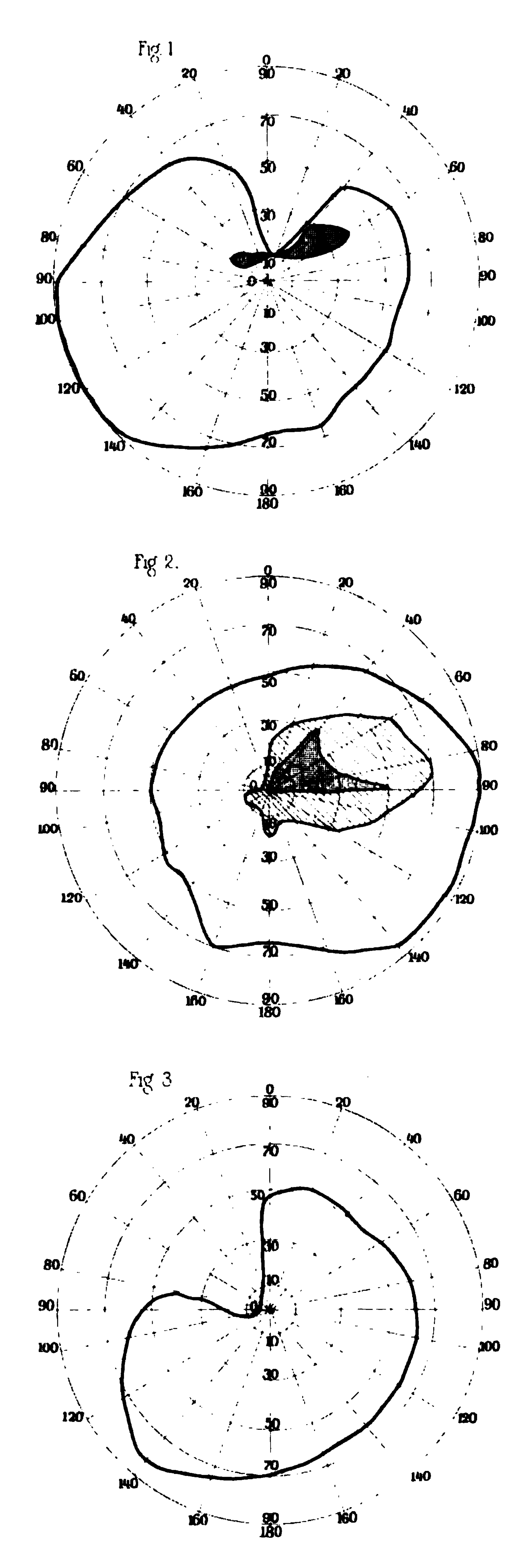
Fig 2

Taf. VI

Fig. 3

Gez. v. Dr. J. [illegible], lith. v. C. [illegible]

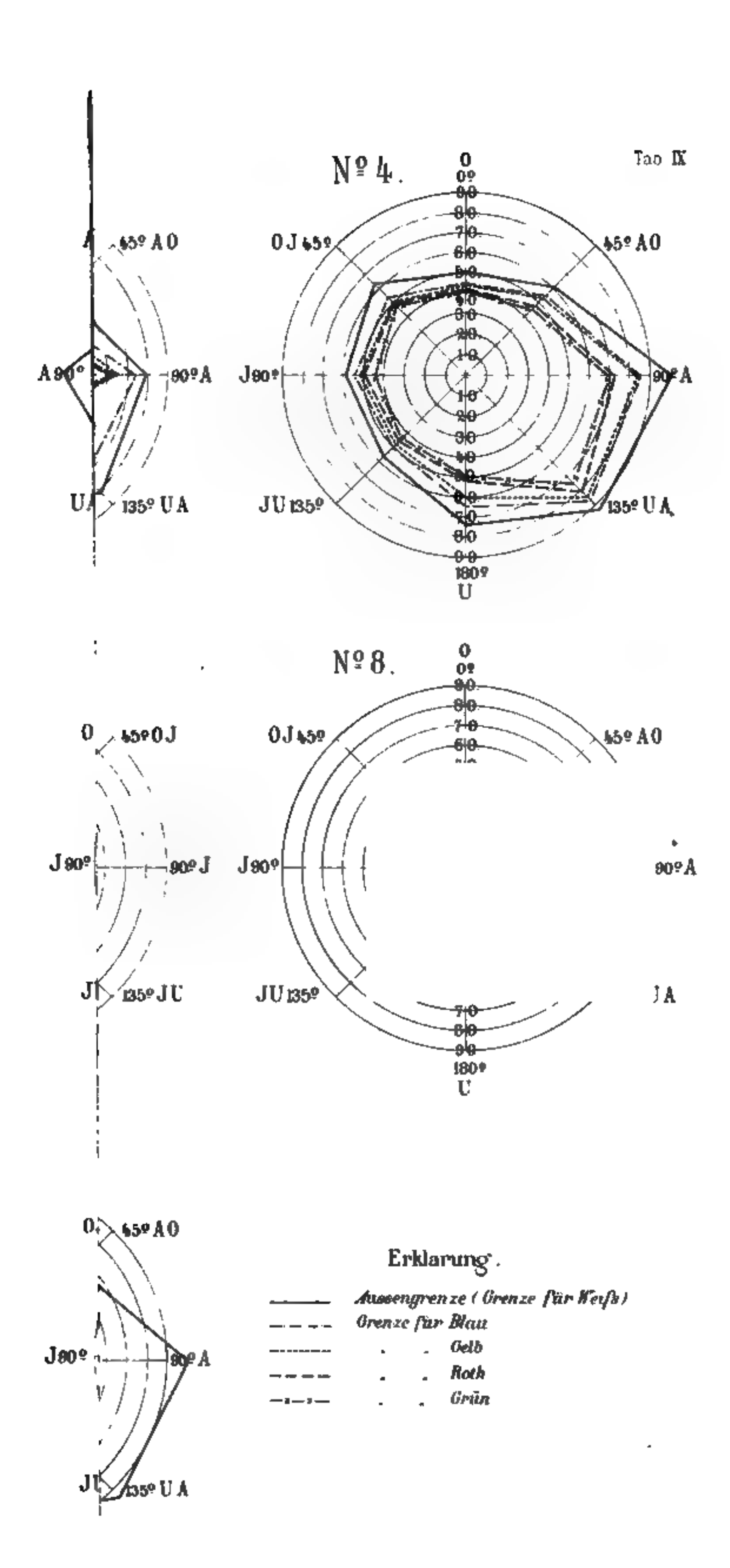
Druck v. J. N. Vernay, Wien



Verlag v. J. F. Bergmann, Wiesbaden
Lith. Anst. v. F. Wirtz Darmstadt

Tab.VIII

Lith Anst v Werner & Winter Frankfurt a/M.



Verlag v. J. F. Bergmann Wiesbaden

